

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

**NPDES Permit No. MD0068322
State Discharge Permit No. 11-DP-3318**

**ANNUAL UPDATE NUMBER 27
FISCAL YEAR 2022**

Submitted to:

**State of Maryland
Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230**

Submitted by:

**Department of Public Works
Howard County Government
Stormwater Management Division
9801 Broken Land Parkway
Columbia, Maryland 21046**

December 7, 2022

Table of Contents

Section I. Introduction	2
A. Background	2
B. Howard County, Maryland.....	2
C. Annual Update Number 27	2
Section II. Standard Permit Conditions	3
A. Permit Administration.....	3
B. Legal Authority.....	3
C. Source Identification	3
D. Management Programs	6
1. Stormwater Management	6
2. Erosion and Sediment Control	9
3. Illicit Discharge Detection and Elimination	11
4. Litter and Floatables	15
5. Property Management and Maintenance	24
6. Public Education.....	32
E. Restoration Plans and Total Maximum Daily Loads	43
1. Watershed Assessments	43
2. Restoration Plans	44
3. Public Participation	54
4. TMDL Compliance	56
F. Assessment of Controls.....	59
1. Watershed Restoration Assessment.....	59
a. Chemical Monitoring	59
b. Biological Monitoring.....	60
c. Physical Monitoring	60
d. Annual Data Submittal	60
2. Stormwater Management Assessment	64
G. Program Funding.....	67
Section III. Program Review and Annual Progress Reporting	69
A. Annual Reporting	69
B. Reapplication for NPDES Stormwater Discharge Permit	69
Section IV. Special Programmatic Conditions	70
A. Chesapeake Bay Restoration by 2025.....	70
B. Comprehensive Planning	70

Section I. Introduction

A. Background

Since passage of the Federal Water Pollution Control Act Amendments of 1972, subsequent amendments have increasingly emphasized the quality control of stormwater runoff. The most recent revision, the Water Quality Act of 1987, establishes permit requirements for both Municipal Separate Storm Sewer Systems (MS4s) and stormwater discharges associated with industrial discharges. Section 402(p) of the Act requires phased permit applications, compliance requirements, and deadlines for application submission and approval.

On November 16, 1990, the final National Pollutant Discharge Elimination System (NPDES) Permit Application Regulations for Storm Water Discharges were published in the *Federal Register*. The Regulations establish Phase I permit conditions for large (serving populations greater than 250,000) and medium (serving populations greater than 100,000 but less than 250,000) MS4s. Included are requirements to effectively prohibit non-stormwater discharges into storm sewers and controls to reduce the discharge of pollutants to the maximum extent practicable. The Regulations also require NPDES permits for stormwater discharges associated with certain industrial activities.

The U.S. Environmental Protection Agency (USEPA) has delegated review and permitting authority for Maryland's large and medium municipalities to the Maryland Department of the Environment (MDE). Within the MDE, the Water and Science Administration is responsible for issuing permits to designated municipalities.

B. Howard County, Maryland

Howard County, hereafter referred to as "the County", with an estimated population of 326,000 according to the Howard County Department of Planning and Zoning (DPZ) 2020 population data, is one of five medium and five large jurisdictions in Maryland that is regulated by a Phase I MS4 Permit. Additionally, the Maryland State Highway Administration is regulated by a Phase I MS4 Permit. Howard County's first permit, (MS-HO-95-008, which was subsequently renumbered to MD0068322, 99-DP-3318), went into effect on April 17, 1995, and expired on April 17, 2000. During this period, Howard County undertook an extensive effort to improve Maryland's water quality and became a state and national leader in the control of stormwater. Howard County's second permit, (Number MD0068322, 00-DP-3318), went into effect on June 15, 2000, and expired on June 15, 2005. This permit included conditions that reflected Howard County's progress toward stormwater management (SWM) program implementation under its NPDES MS4 permit. The County's third permit (Number MD0068322, 00DP-3318) went into effect on June 20, 2005, and was to expire on June 20, 2010, but due to a delay in the issuance of the County's fourth permit, the County continued to operate under its third permit per MDE until December 18, 2014, when the fourth permit was issued. The conditions of the fourth permit (Number MD0068322, 11-DP-3318), are similar to previous permits. As required by the conditions of the permit, the County must prepare Annual Updates to report on the progress made during the preceding permit year.

C. Annual Update Number 27

For Annual Update Number 20 (AR20), MDE required breaking out two six-month permit periods to report on permit compliance under the County's third and fourth permits. Therefore, Annual Update Number 21 (AR21) was the first to report on a full year under the County's fourth NPDES MS4 Permit. The fourth permit expired on December 17, 2019, but has been administratively continued. Therefore, Annual Update or Annual Report Number 27 (AR27) is the seventh full-year report but is considered the report for the eighth year under the County's current NPDES MS4 Permit. Information is presented in the following parts and sections:

Section I. Introduction
 Section II. Standard Permit Conditions
 Section III. Program Review and Annual Progress Reporting
 Section IV. Special Programmatic Conditions

Each section generally begins with the permit conditions, which are denoted in bold italics. Following each permit condition, as applicable, is a description of the progress made toward meeting the permit conditions within the annual update reporting year. Annual data are compiled and reported on a fiscal year basis.

Section II. Standard Permit Conditions

A. Permit Administration

Howard County shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County shall, in its annual reports, submit to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

Annual Update Number 27 Status

The County has included the current organizational information as a narrative file listed in the geodatabase. Mr. Mark S. Richmond, Chief of the Stormwater Management Division (SWMD), is the liaison with MDE and can be reached at (410) 313-6413 or msrichmond@howardcountymd.gov.

B. Legal Authority

Howard County shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County's annual report.

Annual Update Number 27 Status

The County previously submitted a certification from the County Attorney to MDE, which stated that the County possesses the authority to directly perform the activities described in 40 CFR 122.26(d)(2)(i) and the NPDES permit. Specifically, the County Office of Law has certified that the laws of Howard County, Maryland, provide adequate legal authority to carry out Howard County's NPDES Permit for Operators of MS4 programs. The legal authority is adequate to implement programs that control the quality as well as the quantity of water that is discharged through its storm sewer system.

C. Source Identification

Sources of pollutants in stormwater runoff countywide shall be identified and linked to specific water quality impacts on a watershed basis. The source identification process shall be used to develop watershed restoration plans. The following information shall be submitted annually for all County watersheds within the permit area in geographic information system (GIS) format with associated tables as required in PART V of this permit:

1. ***Storm drain system: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;***

2. ***Industrial and commercial sources: industrial and commercial land uses and sites that the County has determined have the potential to contribute significant pollutants;***
3. ***Urban best management practices (BMPs): stormwater management facility data including outfall locations and delineated drainage areas;***
4. ***Impervious surfaces: public and private land use delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;***
5. ***Monitoring locations: locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the 2000 Maryland Stormwater Design Manual; and***
6. ***Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.***

Annual Update Number 27 Status

Updated versions of the County's Source Identification GIS data (items 1. – 6. above) are provided with the digital download of this Annual Update. Several items related to Source Identification are noted below.

Storm Drain System

Outfall records are included in the Outfall and OutfallDrainageArea feature classes of the MDE NPDES Geodatabase. Non-major outfalls are added to the Outfall feature class as a result of the IDDE inspections. In order to fully document the inspections in the database, the outfall where an inspection occurred is included in the database regardless of its major/non-major NPDES outfall status. Other County GIS storm drain system layers are also included with the data submittal including outlets, inlets, storm drains and manholes. This is a separate file listed as a narrative file in the MDE NPDES Geodatabase.

The permit requires that drainage areas be delineated to all BMPs in the County. BMP drainage areas are submitted as the BMPDrainageAreas feature class in MDE's NPDES Geodatabase. The difference between the total number of BMPs and the number of BMP drainage areas is attributable to BMPs such as dry wells, and other small single lot LID practices, where it is impractical to delineate a drainage area to such a localized BMP. At present the County has no plans for delineating drainage areas to each of these individual lot BMPs, but these BMPs are factored into the pollutant removal computations discussed later in this Annual Update. Per MDE's database requirements, records stored in the AltBMPLine, AltBMPPoint, and AltBMPPolygon feature classes do not have a corresponding drainage area.

Industrial and Commercial Sources

Howard County obtained State Department of Assessments and Taxation (SDAT) data, which identified 2,662 commercial and industrial parcels in the county for the 2020-2025 permit cycle. All commercial and industrial parcels were then entered into a Commercial/Industrial CRM database. The County set a goal of conducting a visual survey of over 500 sites each year in order to perform a visual survey on each site within the anticipated five-year permit term. The surveys for the five-year permit term of 2014-2019 were completed in FY19. In FY20, 620 sites were surveyed; in FY21, 397 facilities were surveyed; and in FY22, 519 facilities were surveyed. The surveys are conducted by the four inspectors in the SWMD who also inspect stormwater management facilities and perform illicit discharge field investigations. If inspectors find a discharge during the survey, they photograph the site and try to determine the source. Back in the office, they complete an inspection report and enter the site

information and photos into the Commercial/Industrial CRM database. Any suspected discharges are referred to the County's IDDE Team Leader and the corresponding Field Data Sheet and photos are saved into the SWMD's shared drive. The IDDE Team Leader then follows up on and resolves the suspected discharge. GIS data representing the potential industrial and commercial sources and the FY22 assessed sites are included as a separate GIS database listed in the narrative files.

Urban Best Management Practices (BMPs)

Urban BMP data are included in multiple feature classes and tables in the geodatabase including BMPPOI, BMP, BMPInspections, AltBMPLine, AltBMPLineInspections, AltBMPPoly, AltBMPPolyInspections, RestBMP, and RestBMPInspections. These feature classes and tables encompass development BMPs, restoration projects, and alternative BMPs.

Howard County currently provides BMP data in the database in the point of investigation or POI format. The method accounts for smaller dispersed BMPs built under MDE's Environmental Site Design (ESD) guidance as required by the Stormwater Management Act of 2007. The POI method accounts for nested BMPs and provides an accounting framework for impervious area treatment that avoids double counting but accounts for volumes treated by upstream BMPs. BMPs within a POI system are linked by their drainage patterns and volumes and impervious surfaces are computed as a system. Portions of the County's stormwater BMP dataset have undergone extensive analysis to combine BMPs into POI groups, identify downstream POI relationships, flow-to relationships, and recompute treated volumes and Pe treated values based on the POI network. Other BMPs in the dataset, while still adhering to the POI database framework are set to a one-to-one relationship between the BMP and POI.

Impervious Surfaces

As a requirement of Part IV.E.2.a of the NPDES MS4 permit, the County must conduct an impervious area assessment. The assessment defines the County's impervious area baseline and sets the 20% impervious area restoration goal for pre-2002 impervious acres not already restored to the maximum extent practicable (MEP). The restoration was required to be complete by December 2019, the end of the now administratively continued permit term. As part of the impervious area accounting and restoration process, the MS4 Permit provides for each Phase I MS4 municipality to submit an updated and revised impervious baseline in year four of the current permit, which for Howard County was 2018. The revised baseline can include changes related to newly documented BMPs, updates to restoration BMP crediting, and improvements in the supporting GIS data and databases.

Per the 2014 MDE guidance, the County completed a thorough analysis and delineated the stormwater conveyance or system of conveyances owned and operated by Howard County in its *Impervious Area Classification and Baseline Accounting* report. To define the delineated MS4, Howard County included the Census Urbanized Area, County-owned property and roadway right of way, and those areas that drain to and through the County's currently mapped stormwater infrastructure including outfalls, storm drains, and stormwater BMPs. Howard County submitted the revised impervious baseline in December of 2018 with the NPDES annual report. Per comments from MDE dated August 2, 2019, MDE generally accepted Howard County's methodology but asked for clarification of the classification of impervious acres deducted from Howard County's baseline.

The *Impervious Area Classification and Baseline Accounting* report was revised and included as a Narrative File with AR24 in November of 2019. This version attempted to address MDE's comments, clarify the impervious area assessment, and finalize the County's baseline. The impervious surfaces used in the analysis were included as a GIS database included with the AR24 FY19 narrative files. A draft of MDE's comments on the November 2019 version were received by the County in April of 2020. A major comment addressed the County's use of a delineated

MS4 area to define the impervious areas that the County is responsible for in terms of the 20% restoration goal. Following receipt of the comments and additional discussions between Howard County and MDE, Howard County chose to forgo the use of a delineated MS4 boundary and is using the jurisdiction-wide MS4, per MDE direction, for the purposes of setting the baseline, 20% impervious area restoration target, and performing the final impervious area restoration accounting for the permit term ending in 2019. However, the County reserves the right to revisit the issue in the future should it become necessary.

The County submitted a FINAL baseline accounting methodology and results report to MDE in June of 2020. The County also submitted a final version of the *Howard County Impervious Restoration Accounting: Methodology and Results* report, which addresses MDE comments on previous versions of the report and documents the County's impervious restoration through the end of the permit term.

Both reports were included as narrative files included with the AR25 submittal. Additional details are provided in this annual report under the Restoration Plan section.

Monitoring Locations

The County's NPDES monitoring locations and associated drainage areas are included in the database in the MonitoringSite feature class. Monitoring locations include both the biological and chemical monitoring sites for the Wilde Lake subwatershed monitoring and the Red Hill Branch subwatershed monitoring conducted in fulfillment of Part IV.F.1 Watershed Restoration Assessment.

Part IV.F.2 Stormwater Management Assessment is being conducted at the Rumsey Run project site. Locations of the geomorphic monitoring locations are included with the data submittal as a separate GIS layer.

Howard County conducts monitoring at several other sites beyond what the NPDES permit requires. These sites include the Turf Valley and Dorsey Hall monitoring studies which are further described under permit condition IV.F.1 of the annual report. The Turf Valley monitoring study was completed in 2019, previously collected data and Turf Valley monitoring sites are included in the geodatabase. Monitoring site locations for these sites are included in the MonitoringSite feature class of the geodatabase.

Water Quality Improvement Projects

Water quality improvement projects are stored in several features and tables including RestBMP, AltBMPLine, AltBMPPoly, AltBMPPoint and their associated Inspection tables of the MDE NPDES Geodatabase. For this database, the County is using the expiration of its 3rd generation permit date of June 20, 2010, as the cutoff between projects associated with the old, versus the current permit; however, all improvement projects are included in the dataset.

D. Management Programs

The following management programs shall be implemented in areas served by Howard County's MS4. These management programs are designed to control stormwater discharges to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. The County shall modify these programs according to needed program improvements identified as a result of periodic evaluations by MDE.

1. Stormwater Management

An acceptable stormwater management program shall continue to be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

- a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the 2000 Maryland Stormwater Design Manual. This includes:*
 - i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;*
 - ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and*
 - iii. Reporting annually the modifications that have been made or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.*
- b. Maintaining programmatic and implementation information including, but not limited to:*
 - i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;*
 - ii. Number of redevelopment projects received;*
 - iii. Number of stormwater exemptions issued; and*
 - iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.*

Stormwater program data shall be recorded on MDE's annual report database and submitted as required in PART V of this permit.

- c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by Howard County.*
- d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports.*

Annual Update Number 27 Status

Stormwater Management Act Compliance

The County continues to comply with the Act and implement ESD to the MEP for new and redevelopment projects under the current version of the Design Manual, including the 2009 revision for ESD, as well as provide feedback on that version, as necessary. The County has had no modifications to the design manual requirements regarding ESD to the MEP, and there are no programmatic problems to address at this time.

In 2017, Council Resolution CR94-2017 revised Volume I (Storm Drainage) of the Design Manual to mandate a specified amount of rainfall for 100-year storms; to clarify provisions related to open channels; to amend provisions related to stormwater management facilities in Howard County; and to make technical changes related to Volume I, Storm Drainage, of the Design Manual. This resolution has not changed MDE requirements for ESD to the MEP.

In 2018, Council Bill CB56-2018 was approved to provide peak stormwater management within the Tiber and Plumtree Branch watersheds. This bill was in response to the historic flooding within historic Ellicott City. This bill requires additional stormwater management beyond the 100-year storm event. There have been no changes to the Howard County requirements to provide ESD to the MEP.

In 2019, Council Resolution 123-2019 revised Volume I of the Design Manual to mandate a 24-hour 100-year and 3.55-hour 6.6" storm event be managed within the Plumtree watershed. Additionally, the resolution mandates the 3.55-hour 6.6" storm event be managed within the Tiber Branch watershed. The 24-hour 100-year event requirement already existed within the Tiber Branch watershed. General drainage requirements were revised within both watersheds to require that the conveyance systems to the storm facilities convey the peak intensities of these storm events.

Stormwater Management Programmatic and Implementation Information

Stormwater management is reviewed for compliance with the Howard County Design Manual, Volume I – Storm Drainage, throughout the development process by Planning and Zoning – Development Engineering Division. The programmatic and implementation information identified as i. – iv. above has been included in this Annual Update in the database under Stormwater Management as required by Part V of the County's MS4 Permit.

Construction Inspection

Stormwater construction inspections are the responsibility of Public Works – Construction Inspection Division. A summary of the stormwater construction inspections and violation notices issued is listed in Table 1 and is listed in the SWM Associated Table in the geodatabase.

Table 1: Construction Inspections

Summary of Inspections and Violations	Total July 1, 2021 – June 30, 2022
Number of Construction Inspections	7,675
Number of Construction Violations	82

Preventative Maintenance Inspections

The SWMD is responsible for SWM BMP inspections, which continue to be performed for County, Board of Education, and private SWM facilities on a triennial basis. A summary of the inspections from July 1, 2021, through June 30, 2022, is listed in Table 2. There are currently 1,565 County-maintained BMPs, 167 Board of Education BMPs, 3,387 privately owned and maintained BMPs, and 6,869 privately owned and maintained residential ESD BMPs for a total of 11,988 BMPs, which are inspected on a three-year cycle.

Table 2: Preventative Maintenance Inspections

Inspection Detail	Inspections July 1, 2021 - June 30, 2022
Maintenance Inspections	5,065
County Maintained BMPs	610
Board of Education Maintained BMPs	70
Privately Maintained BMPs	941
Residential ESD BMPs	3,444
Follow-up Inspections	403
Enforcement Actions (Extra Follow Up)	1 Citation / 16 NOVs
Total	5,485

** The inspection cycle for Board of Education Maintained BMPs begins once the students are released for the summer of each year.*

The County sends a letter to the owner of any BMP needing corrective action (structural or non-structural) giving them a deadline for addressing the items. The County performs follow up inspections to verify that compliance is achieved. If the owner does not comply, a citation or NOV is issued. A Notice of Violation is a warning letter providing owner 14 days from the date of the letter to either correct the deficiencies or request an extension in writing. A citation is the legal action taken to initiate an actual fine or civil penalty against the owner. This action takes place if after 14 days, there has been no contact with the owner.

Inspections for tree planting sites are performed by the Department of Recreation and Parks. Inspections are performed according to the *Policies and Procedures: Reforestation Tree Planting on Public and Private Lands, Inspecting Forest Conservation Easements, and Inspecting Forest Conservation Easements with GIS Tools*. Inspections for voluntary BMPs on private property and those installed by Howard EcoWorks, formerly READY, are performed by the Office of Community Sustainability. Long-term verification inspections for stream restoration projects are performed by the SWMD.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall continue to be maintained and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

- a. Implementing program improvements identified in any MDE evaluation of the County's erosion and sediment control enforcement authority;***
- b. Ensure that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by MDE;***
- c. Program activity shall be recorded on MDE's annual report database and submitted as required in PART V of this permit; and***

- d. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.***

Annual Update Number 27 Status

Howard County submitted its renewal application for delegation of erosion and sediment control (E&S) enforcement authority on October 8, 2020. MDE conducted a desktop assessment of the submitted documentation for active construction sites between December 2020-January 2021. The review was of 19 active sites totaling 206 acres of earth disturbance. Follow-up site inspection documentation was immediately provided as needed. MDE's written review and re-authorization letter was received on May 21, 2021, granting Howard County delegation authority effective through June 30, 2023.

Program Improvements

To maintain and improve inspection skills and current knowledge of laws and specifications the Construction Inspection Division (CID) requires all inspection staff to participate in self-paced training. Topics include E&S Law, Proper Documentation and Lessons Learned (a historical look at common problems and solutions), and E&S field inspection report review. There are continuous inspections conducted of each inspectors' sites to evaluate E&S controls and site compliance relative to the approved plans and specifications, as well as continuous spot reviews of inspection staff reports to evaluate the descriptive and informative information being provided. In the spring of 2022, the Inspector Daily Report (IDR) was modified utilizing feedback generated following a meeting with MDE personnel. The form upgrades focused on the components necessary for reporting compliance which include a) Administrative information, b) Purpose of inspection, c) Description of findings, d) Weather, e) Enforcement Action taken, and f) Certification of report. The upgrades included checkbox options, specific comment designated areas, clarified responsible party contact information and IDR transmitting, and designated pages for photos and additional commenting. Following the upgrade of this document, a presentation was made to the Division on March 30, 2022, presenting the new document and utilizing the meeting to train on Documentation focus. This new IDR was put into use as of April 1, 2022.

The Erosion and Sediment Inspection Manual is updated to reflect applicable changes in laws, specifications and division policy regarding Erosion and Sediment Control.

Responsible Personnel Certification

In accordance with the re-authorization letter issued by MDE on May 1, 2015, the following process is in place relative to the Responsible Personnel certification:

"This training may now be taken on MDE's website and all inquiries should be referred to this on-line application that will now satisfy the County's MS4 permit obligations."

MDE issues the certification online. Required CID staff and consultants have taken the online class, registered in MDE website and acquired their Responsible Personnel Certifications.

In addition to the CID staff that are Responsible Personnel certified, as of July 2022, the Division has two staff members who are Certified Professional in Erosion and Sediment Control (CPESC) certified, and one staff member is National Institute for Certification in Engineering Technologies (NICET) certified in Land Management & Water Control/Erosion and Sediment Control.

Program Activity

The electronic program activity information has been included in this Annual Update, in the database under the Erosion Sediment Control Associated Table as required by Part V of the County's MS4 Permit.

Earth Disturbances > 1 acre

Construction Inspection Division submits quarterly reports for earth disturbances greater than one acre directly to MDE. This information is also included in the Annual Report database under Quarterly Grading Permit Feature Class and Quarterly Grading Permit Information Associated Table as required by Part V of the County's MS4 Permit.

3. Illicit Discharge Detection and Elimination

Howard County shall continue to implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Activities shall include, but not be limited to:

- a. *Field screening at least 100 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit. Within one year of permit issuance, an alternative program may be submitted for MDE approval that methodically identifies, investigates, and eliminates illegal connections to the County's storm drain system;*
- b. *Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed shall be reported annually;*
- c. *Maintaining a program to address and, if necessary, respond to illegal discharges, dumping, and spills;*
- d. *Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and*
- e. *Reporting illicit discharge detection and elimination activities as specified in PART V of this permit.*

Annual Update Number 27 Status

Howard County's Illicit Discharge Detection and Elimination (IDDE) program incorporates four components to meet the permit requirements:

- Prevention Program
- Detection Program
- Removal and Compliance Program
- Program Management and Reporting

Prevention Program

The County's IDDE Program uses public outreach and in-house employee training to prevent illicit discharges. Outreach is also done at community events such as the annual "GreenFest" event. In-house training is conducted for County employees who work at facilities which are regulated under the General Permit for Stormwater

Discharges Associated with Industrial Activities (12-SW) or which have a Spill Prevention Control and Countermeasure (SPCC) Plan. In FY22, 345 County employees took the training course online.

In order to prevent deliberate discharge of leaves to the storm drain inlets, Howard County has continued to send letters addressing the several options available for residents to discard unwanted yard waste. We emailed leaf flyers to all HOAs in the County in fall 2021 so that the HOAs could educate their residents on proper handling of leaves. We mailed information posters to 457 automotive businesses in the County. The County also utilizes an illicit discharge reporting form on its SWMD website with a hotline number for public reporting of an illicit discharge. The web address is:

<https://www.howardcountymd.gov/report-illicit-dumping-storm-drain>

Illicit discharge complaints can also be reported through the TellHoCo smart phone app. Info entered in the app includes a map, photos, and a description of the possible issue and directly notifies the IDDE manager. In addition, the County is proactively surveying all commercial and industrial properties in the County to identify potential illicit discharges.

Detection Program

Howard County responded to 89 potential discharge cases in FY22. A summary of these cases is included as a narrative file in the geodatabase. These were identified through the three programs in place to detect illicit discharges.

1. The first program is the inspection of at least 100 outfalls per year. The inspections this year were focused on the Route 1 corridor and the commercial area of Clarksville. The County tells the contractor which areas to cover during the inspections. The contractor then identifies at least 100 outfalls to inspect. They visit the outfalls at least 72 hours after a precipitation event and look for flow. If they see any flow, they collect a sample and analyze it for the required analytics. They then trace the discharge up the storm drain system to identify the source. The contractor then calls or emails the County IDDE Team Leader to report the discharge, so the County can follow up with the property owner to stop the discharge. Of the 103 outfalls inspected in this reporting period, four suspected discharges were identified.
 - a. Outfall 255420: This discharge exceeded the detergent threshold during the first test, but was below the threshold limit during the second test. The County issued an NOV requiring the operator to discontinue outdoor washing. The operator has complied, and the case has been closed.
 - b. Outfall 255424: The discharge was brown and had a trash odor. It tested high for detergents and was borderline for phenols. The County issued an NOV requiring the recycling facility to prevent discharge of contaminants to the outfall. The facility provided maintenance records of outfall inspections and boom replacements. The County will inspect this site periodically.
 - c. Outfall 255464: The County's contract inspectors discovered a sewage overflow, which they referred to the County Bureau of Utilities to correct.
 - d. Outfall 255496: County contractors detected detergents above the threshold level and a rancid odor in an outfall during outfall sampling. The discharge came from a small HDPE

pipe leading from the Maryland Food Center into the outfall. We sent an NOV requiring disconnection of the illicit connection and proper disposal of produce washwater. MFCA agreed to investigate the potential illicit connection and install signs prohibiting outdoor washing.

2. The second program is a visual survey of commercial/industrial parcels, conducted by County inspectors. If the inspectors see any suspected discharges, they try to identify the source and notify the IDDE Team Leader. In this reporting period the County conducted 519 visual surveys resulting in one illicit discharge detection that required further action.
 - a. A County inspector conducting a commercial/industrial inspection saw sudsy water on the pavement outside a Wendy's restaurant leading from the sidewalk to the storm inlet. the County issued an NOV to the property owner requiring training of the restaurant employees in proper washing procedures to keep wash water out of the storm drain system. The County received a call and email from the restaurant manager agreeing to train restaurant staff to stop using cleaning chemicals outdoors.
3. The third program is a response to reports of illicit discharge received from the public, Howard County departments, MDE, or EPA. This category also includes happenstance discoveries made by Howard County Stormwater Management inspectors in the course of their duties. Howard County responded to the following complaints/reports in FY22:
 - a. 52 reports were received directly from the public via phone, email, postal mail, County website submission, "TellHoCo" web app, or walk-in.
 - b. 35 reports were referred by other Howard County agencies.
 - c. 2 reports were referred by MDE.

Removal and Compliance Program

The County uses the procedure described below to address illicit discharges.

Initial Response: Phone call, email, or inspection. After responding the inspector will complete an Inspection Report in the CRM database and provide the owners a copy if requested. The report will identify any problems identified and actions required, including possible notification, referral, and/or collaboration with other government agencies. This method is used with both industrial/commercial discharges and residential (individual or Homeowners Association) discharges.

Notice of Violation: The County issues a Notice of Violation (NOV) for more serious or repeat discharges. The NOV will require the owner to respond within two weeks with a plan of action, and to perform corrective action within a specified time frame (typically 60 days).

Citation: In the case of very serious or repeat (unabated) discharges, the County will issue a civil citation. Under Howard County Code, prohibited discharges and illicit connections are a criminal misdemeanor subject to a fine not exceeding \$900.00, or imprisonment not exceeding five months or both. Alternatively, or in addition to and concurrent with criminal penalties, the County may enforce prohibited discharges and illicit connections as a Class A civil offense, subject to a minimum fine of \$500 and a maximum fine of \$1000 per day.

Abatement/Compliance Verification: The County will request that all illicit discharge violators submit proof (photos, contractor's inspection notes, e-mail or letter) that compliance was completed within the specified time frame. If necessary, the County will follow up at violation sites to ensure that compliance occurs in a timely and effective manner. Visual observation and, if necessary, monitoring will be performed to verify that the illicit discharge was stopped and/or necessary permit obtained.

Howard County found cases that required abatement by the Illicit discharge program. We sent out 4 citations and 25 Notices of Violation. We referred 35 cases to either the Construction Inspection Division, the Bureau of Highways or the Department of Recreation and Parks for further action. The remaining cases were resolved with either verbal onsite contact or an educational letter sent in the mail.

Six types of cases are frequently referred to other Howard County departments:

1. Water/sewer leaks (to Bureau of Utilities)
2. Construction site erosion & sediment control complaints (to Construction Inspection Division)
3. Trash nuisances & dumping, not affecting storm drains or waterways (to Health Department)
4. Prohibited vehicle storage not affecting storm drains or waterways (to Department of Planning & Zoning)
5. Debris along roadways or other County property (to the Bureau of Highways, or the Department of Recreation and Parks).

Fourteen cases were investigated but found not to be illicit discharges, generally including:

- Iron floc
- Sump pump discharge
- Groundwater flows
- Small spills/leaks properly cleaned up before reaching a storm drain or waterway
- Allowable pool discharges

Program Management and Reporting

Howard County's IDDE Program has a staff of seven, including one engineer, one planner, four inspectors and the inspection supervisor, who carry out the duties of the IDDE Program. This involves following up on reported illicit discharges and proactively doing commercial and industrial site surveys. The inspectors immediately report any illicit discharges found and the manager follows up with the owner to eliminate and remediate the issue. IDDE field data sheets, inspection photos, and support documents such as e-mails and letters, are saved in hard copy as required by law, and in digital format to the County's IDDE database and/or local network servers. All IDDE screenings, surveys, inspections and enforcement actions are recorded, tracked, and reported to MDE each year in the NPDES MS4 Annual Report.

Enhanced IDDE Program

During the outfall sampling effort, Howard County's contractor was ready to collect grab samples for analysis of nutrient and bacteria pollution from flowing outfalls for potential enhanced IDDE pollution reduction credits. However, the only flowing outfall that was identified had a positive field test only for chloride and detergents, and therefore was not eligible for enhanced IDDE pollution reduction credits.

Ongoing Enforcement Efforts

LKQ: Howard County is coordinating with the MDE Water and Science Administration Compliance Program and the Oil Control Program on this case. MDE and LKQ reached Consent Order CO-21-2691 in January 2021 to address the discharge of pollutants from the site. At that time Howard County withdrew the citations which were under litigation in the Circuit and District Courts.

Roberts Property: Howard County is coordinating with the MDE Water and Science Administration Compliance Program on this case. We understand that MDE is working to bring the site into compliance under the Voluntary Cleanup Program. We will continue to inspect the site periodically to monitor any cleanup progress.

4. Litter and Floatables

This section of the permit requires Howard County to address problems associated with litter and floatables in waterways that adversely affect water quality. Increases in litter discharges to receiving waters have become a growing concern both nationally and within Maryland and cannot be ignored. Howard County needs to evaluate current litter control problems associated with discharges from its storm drain system and develop and implement a public outreach and education program as needed on a watershed by watershed basis.

- a. As part of Howard County's watershed assessments under PART IV.E.1 of this permit, Howard County shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.*
- b. Within one year of permit issuance, as part of the public education program described in PART IV.D.6., Howard County shall develop and implement a public education and outreach program to reduce littering and increase recycling. This shall include:

 - i. Educating the public on the importance of reducing, reusing, and recycling;*
 - ii. Disseminating information by using signs, articles, and other media outlets; and*
 - iii. Promoting educational programs in schools, businesses, community associations, etc.**
- c. Evaluating annually the effectiveness of the education program.*
- d. Submit annually, a report which details progress toward implementing the public education and outreach program. The report shall describe the status of public outreach efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components.*

Annual Update Number 27 Status

Recycling Division Programs

Howard County Recycling Division continues to provide many recycling opportunities and information to County residents and businesses, as well as County government operations. In 2021, a total of 212,848.69 tons of recyclables were recycled by businesses and residents. Of that, 33,568.99 tons of recyclables were collected curbside and 27,961.45 tons through drop-off programs at Alpha Ridge Landfill.

Weekly residential single stream recycling collection is provided to over 85,000 single family homes, townhouses, mobile home parks and condominiums. Seven collection routes also have food scrap collection. The Alpha Ridge

Landfill Residents' Convenience Center accepts a wide variety of recyclable materials including: paint, food scraps, compressed gas tanks, electronics, rigid plastics, cardboard, mattresses and box springs, cooking oil, motor oil & filters, anti-freeze, wet cell batteries, clothing & textiles, tires, scrap metal and appliances, reusable bicycles, books, durable medical equipment and single stream recycling. Wood waste, yard trim, manure, and other organics are collected in separate areas at the landfill for processing. All County residents may use the convenience center with proof of residency. Businesses may also use the center for recycling if the materials originated in the County. On-going recycling events include paper shredding, Christmas tree recycling, backyard composting, pumpkin drop-offs and a variety of other education and outreach programs geared towards audiences of all ages. Single stream recyclables are collected from County buildings and facilities on a weekly schedule; County agencies also bring items to Alpha Ridge Landfill for recycling such as wood debris and yard trim.

The County provides education and outreach to the public on the importance of waste reduction, reusing, and recycling and through disseminating information in the following manners:

- During FY22, the Recycling Division distributed a significant amount of recycling and waste reduction literature to households and businesses that emphasize reducing, reusing and recycling. In addition, material was available through local libraries, public buildings and events. Outreach to businesses and residents was also achieved through the County's website, www.HowardCountyRecycles.org.
- A monthly e-newsletter is sent to 22,000 residents. Residents opt-in to receive this newsletter which highlights holiday schedule changes, shredding events, tips and updates on the recycling program. Recent newsletters can be found at <https://www.howardcountymd.gov/recycling-e-newsletter>
- Print ads relevant to the importance of reducing, reusing, and recycling promoted to the public in the following:
 - Armed Forces Directory
 - Howard County Chamber of Commerce Directory
 - Howard County Visitors Guide
 - The Beacon
 - The Parent's Guide to Howard County
 - Senior Resource Guide
 - Welcome to the Neighborhood
- Promotional items that encourage recycling and include recycled content are available.
- An animated video was made to help schools properly sort their recycling and food scraps in the cafeteria. The video is available on the new webpage devoted to improving recycling and composting in HCPSS: <https://www.howardcountymd.gov/HoCoSchoolsRecycle>
- Recycling and waste reduction literature was distributed at libraries, schools, County buildings, community associations, senior centers, and businesses and directly to individuals. Brochures can also be found on the County's Recycling website at www.HowardCountyRecycles.org
- Regular outreach through social media such as Twitter, using the Twitter account [@HoCoRecycles](https://twitter.com/HoCoRecycles) promotes recycling, composting and waste reduction.

The County's Recycling Coordinators provide educational programs in schools, businesses, community associations, etc. These efforts include:

- Participating in community, school and corporate events with a recycling exhibit and educational materials.

- Continued distribution of school recycling information through school programs, brochures and visually appealing lunchroom recycling posters in public and private schools for all age groups.
- Presentations (virtual and in-person) and tours at the Alpha Ridge Landfill.
- The School Board and the County continue to collaborate on a collection contract for trash and recycling. Collection is provided weekly for trash and recycling from lidded dumpsters as well as collection from wheeled, lidded carts for single stream recycling at all HCPSS schools and facilities. Seven schools participate in the food scrap collection program; collected food scraps are composted at the County composting facility.
- Technical support provided as requested to businesses throughout Howard County. A section on specialty recycling along with business recycling options has been posted on the website at www.HowardCountyMD.gov/Business-Recycling.
- Continued promotion of recently developed education campaigns to encourage proper recycling (www.KnowBeforeYouThrow.org) and reduce wasted food ([Food Waste Prevention](#)). Continue promotion of interactive Know Before You Throw online sorting game.
- Development of a timeline for the Food Scrap Program and Composting Facility, providing residents with historical data as well as expansion updates.

Adopt-A-Road Program/Waste Removal

The County "Adopt-A-Road" volunteer program continues to be very successful. The Adopt-A-Road Summary in Table 3 below provides a breakdown of the different zones for the Adopt-A-Road program FY22 that details the amount of trash collected, the mileage of road adopted, and the number of roads adopted by zones. More information about the Adopt-A-Road program can be found on the County's website:

<https://www.howardcountymd.gov/Departments/Public-Works/Bureau-Of-Highways/Adopt-A-Road-Program>

In addition to the Adopt-A-Road program, County also conducts litter removal on over 40 different roadways that are prone to litter concerns on a regular basis, has volunteer groups that pick up trash on occasion, and also responds to citizen complaints on other roadways on an as needed basis.

Table 3: Waste Removal Summary

Program	Trash Bags Collected	Estimated Miles Cleaned
Adopt-A-Road	220	1
Stream Cleanup	218	2
Waste Removal	140	102
Total	578	105

Howard EcoWorks Channel Maintenance Program

Howard EcoWorks removed 4,090 lbs of litter from county streams during channel clearing efforts within the reporting period.

Howard EcoWorks regularly collects trash when doing tree maintenance work on County Forest Conservation Areas and stream restoration projects. There are currently 21 sites where Howard EcoWorks has done or continues to do this work. Volume and weight of litter collected are not tracked during these projects.

Office of Community Sustainability (OCS) Litter Removal and Education Efforts

OCS implements the 20 Minute Cleanup, a litter removal and awareness project. From 2016-2019, over 9,660 volunteers participated in this litter removal project. Due to COVID-19 and the Stay At Home Order, the 20 Minute Cleanup was not held in 2020. In spring of 2021 a handful of 20 Minute Cleanup reports were received, but the County did not advertise it, nor hold the annual County event due to COVID. In spring of 2022, the 20 minute clean up included 376 volunteers collecting 157.5 bags during 175 hours.

OCS also assists DRP with stream cleanups such as Project Clean Stream and International Coastal Cleanup.

OCS oversees the use of the local version of the storm drain stencil, which reminds residents not to litter or put anything down stormdrains with the message “Only Rain Down the Drain. Drains to Patapsco [or Patuxent].” Over 550 drains were stenciled between 2016-2022.

Plastic Reduction Law

The Plastic Reduction Bill, CB13-2021 went into effect January 1, 2022 and enforcement begins July 1st 2022. The bill reduces the amount of plastic distributed at food service facilities (such as restaurants, bars, coffee shops) and retail stores (such as grocery stores) by prohibiting the distribution of certain plastic items unless specifically requested by the customer. Plastic straws, stirrers, condiment packets, utensils, containers and lids cannot be distributed unless requested at food service facilities. These businesses can either re-train staff to ask customers if they would like these items or they can replace these items with paper, home compostable or reusable items. For retail, businesses cannot sell or distribute single use plastic straws or stirrers unless paper or reusable straws or stirrers are also available for purchase in the same location. There are some exceptions to the law depending on the type of service (such as drive through or self-service), the type of item (such as cup lids) and the location (such as hospitals and nursing homes). You can find more details on the law and the exceptions here: <https://livegreenhoward.com/plastic-reduction-law/>

Plastic Reduction and Environmental Protection (PREP) 2021 Grants

The Plastics Reduction and Environmental Protection (PREP) grant program is funded by the Plastic Bag Fee that went into effect Oct. 1, 2020. In 2021, \$243,165 was awarded to 10 environmental non-profits in Howard County to complete 11 projects focused on water quality and water pollution education, environmental education programs that support school curriculum, stream clean ups, and anti-littering education.

Three projects, the Howard County Conservancy’s Watershed Report Card program, Howard Ecoworks’ EcoAmbassadors program, and Volunteers social media contest engaged and educated students from HCPSS. Savage Community Association’s project worked with Howard County Girl Scouts on environmental education projects and Community Ecology Institute’s Maker Space workshops and Friends of the Patapsco Valley State Park’s Mobile Visitor Center engaged and educated even more Howard County residents. Howard Community College, Howard County Conservancy, Volunteers, Upcycled, and Murray Hill Homeowner’s Association’s projects engaged in anti-littering and plastic reduction education and/or waste clean ups. The Patapsco Heritage Greenway focused on water quality monitoring.

Department of Recreation and Parks Programs**Natural and Historic Resources Division****Park Ranger Programs**

The Park Ranger Program conducts interpretive programs throughout the year. These programs are an outreach initiative committed to expanding environmental literacy, educating the public on natural resource topics and encouraging stewardship of the environment. Multiple program topics relate to current efforts, including:

- *Bats Amazing!* Explores the incredible world of the local and favorite flying mammal, the bat! Participants learn all about their amazing adaptations, their role in healthy ecosystems, threats to their conservation, and take-home tips for bat-friendly habits. This includes a night hike to scout for the nocturnal animal.
- *Bird ID*, Participants learn the basics of birding and bird identification on an interactive walk with an HC Park Ranger. All participants, of all experience levels will have an opportunity to distinguish common bird calls and explore local bird habitats.
- *Read with a Ranger*, where Park Rangers read books to children ages 0 – 8 years relating to conservation and stewardship.
- *Ladies Day Out – Morning Hike and Nature Journaling*, a morning trail walk at Robinson Nature Center lead by an Environmental Educator and a Park Ranger. Utilizing a nature journal, participants will make observations of springtime plants and wildlife during the walk. While recording observations in a nature journal, guided sketching and writing prompts are designed to improve nature journaling skills.

Park Ranger Volunteer Events

Park Rangers manage volunteer trash pickups as part of the Park Watch volunteer program. One of the components of Park Watch is stewardship of natural resources. Due to COVID-19, no 2022 efforts were coordinated.

Park Operations

- Zone 1 has over 7 miles of pathway and natural trails that border waterways in the Middle and Little Patuxent River valleys. Staff spends approximately 300 hours annually keeping trails and paths open, repairing erosion, and reducing sedimentation deposits on these arteries. Much of this work is to slow down storm water runoff in riparian areas.
- In 2022 park attendance increased 25% over 2021, requiring 40% increase in trash removal operations because of the pandemic. As attendance increases in 2022 maintenance operations planning is essential to support public users and maintain parklands.
- Zone 2 has 11 pavilions that are rented 7 days a week from April 1st- November 30th. Staff spend 8 hours a day pulling trash and recycle cans from pavilion usage. Additionally, staff pick up loose trash from the roadways and approximately 2.6-mile pathway at Centennial Park. Zone 2 average trash pick per year is 51,000 pounds and 51,000 pounds of recycling. On average 2 tons of grill ashes and charcoal are collected each month for disposal from Centennial Park. Zone 2 staff manage volunteer trash pickups, landscape maintenance and tree plantings within the parks.
- Zone 3 handles the refuse task by emptying 157 cans and 107 recycle cans seven days a week. Several man hours are also spent picking up all loose trash within the Zone. This aids in the effort to keep our streams and water ways clean.
- Zone 4 spends over 2,000 hours picking up loose trash annually throughout the parks and emptying lined trash cans into dumpsters. Recycling is emptied from the liner into the recycling dumpster to reduce waste and damage to recycling equipment. The public is provided with an equal number of trash and recycling cans paired throughout each park in the zone, as well as parking lots managed by zone 4.
- Zone 5 has over 68 cans and three pavilions that are emptied 7 days a week. There are 6 dumpsters and a 10-yard rollback dumpster that are used primarily used from March to November. Approximately 2600-man hours are spent each year on loose trash and emptying cans.

Howard County GreenFest

- GreenFest is Howard County's largest celebration of Earth Day. The event aims to connect residents with the resources that local businesses, non-profits, and government provide to help anyone be a good steward to the environment. The 2022 event was held at Howard County Community College on Saturday, April 9, 2022. HCRP was represented by members of the Natural and Historic Resources Division.

Innovative Recycling Programs and Demonstrations**Robinson Nature Center**

Robinson Nature Center has numerous demonstration areas and partners with local and regional groups to promote programs that recycle organic materials for uses consistent with mitigating storm water runoff and sediment discharge.

Demonstration Areas

Composting Demonstration Area – Robinson Nature Center currently houses a compost demonstration area off our parking lot that shows various methods for composting. Members of the public can join Master Gardeners one day each month from May through October to learn more about composting and receive a free compost bin kit if they reside in Howard County.

Rain Garden Demonstration Area – Robinson Nature Center has four different rain gardens on the property with two of them in locations the public frequently accesses. These rain gardens showcase for our visitors how including this type of landscape feature can reduce storm-water run-off from impervious surfaces as well as reducing run-off that would lead to erosion along steeper grades.

Pervious Paving Demonstration Area – Robinson Nature Center's main parking area is composed of pervious pavement which allows visitors to see the difference between run-off on the main circle drive (asphalt to ensure durability for heavy vehicle traffic) and the pervious pavement.

Recycling and Waste-Reduction Initiatives

- **Snack-wrapper Recycling** – Begun at Robinson Nature Center, Howard County Department of Recreation and Parks (HCRP) collected foil-lined wrappers for recycling through The Clif Bar recycling program with TerraCycle. Since beginning collection in 2017, HCRP diverted more than 39,000 wrappers for recycling this way. This program ended in February 2020.
- **Oyster Shell Recycling** - Since 2013, Robinson Nature Center has partnered with the Oyster Recovery Partnership to be an official drop-site for oyster shell recycling. Members of the public can drop their oyster shells at the Center's shell recycling caddy and staff from the ORP retrieves the shells for use in oyster reef recovery programs in the Chesapeake. The recycled shells provide substrate upon which new oysters can grow, thus helping revitalize the oyster population and its valuable ecosystem service of filtering the waters of the Chesapeake Bay.

As of June 2022, Robinson Nature Center had provided just over 130 bushels of shell for recycling. That's enough shell to grow more than 600,000 baby oysters to be planted back into the Chesapeake Bay.

- **Composting & Compostable dishware-** Since 2013, Howard County Master Gardeners have held free compost demonstrations at the Center during which residents of the County are provided with instructions on how to create and manage their own backyard compost piles. Howard County's Office of Recycling provides free compost bins to residents at these demonstrations. The residential composting operations allow families to use organic, natural fertilizer in place of commercial and chemical fertilizer.

Beginning in January of 2018, Robinson Nature Center switched from disposable to compostable dishware for programming use. Through that initiative, we have composted over 247 pounds of food and dishware waste.

Since April 2019, the Nature Center designed compostable dishware packages for birthday parties and rentals. These packages allow those renting the building for an event or party the option of having the Nature Center supply compostable dishware for their event and reduce the event's waste/ecofootprint. In addition, Robinson installed permanent indoor compost bins in our classroom spaces in June 2021 to allow for the regular separation of compost from other waste during all rentals and public programs.

Public Programming, School Field Trips and Events at Robinson Nature Center

In FY2022, Robinson returned to a majority of in-person programming while still maintaining the take home and virtual options we began during the pandemic. We continued to see popularity in the outdoor only programs such as outdoor early childhood classes (29 classes, serving 394 participants) and outdoor birthday party rentals (19 parties, serving 515 participants). New programming developed like the Senior Naturalist series, Naturally Family Time Series, and the Maple Sugaring & Syrup Tasting Special Event. Field trips made a great return to the nature center (42 on-site field trips, serving 2,612 participants) and we still had many schools take advantage of virtual and off-site options (16 virtual field trips, serving 182 participants and 20 off-site field trips, serving 414 participants). Mission-driven programming connecting participants to their natural resources is a key component of the Nature Center's goals and promotes environmental stewardship to all generations. Key programs of note contributing to education on issues such as stormwater runoff, recycling, pollution management and integrated pest management include:

- Jr. Naturalist program: Be the Solution to Pollution, Wake Up Wildlife
- Schools Out Camp: Wonders of Water
- Home School Classes (Nature's Recycler's, Weather & Climate, Population Dynamics, Food webs)
- Adult Seek & Stroll program
- Senior Naturalist program
- Family River Romps during the summer
- Water Works Field Trip
- Childhood Nature Education- Project Learning Tree and Getting Little Feet Wet trainings
- Summer Camps (Jr. Naturalist, River Explorers, Stream Searchers, Jr. Eco-Engineers)

Park Operations

- Zone 1 is taking steps to comply with new restrictions enacted on recycling by reducing the recycling containers in our park sites and adding regular trash receptacles. Existing recycle containers will be amended to only accept bottles and small articles to eliminate contamination to assist recycling plant operations by reducing contaminants. 3 new water fountains have been installed with water bottle fillers to allow patrons to reuse water bottles and reduce one time use recyclables.
- To promote recycling, Zone 2 maintains thirty-five recycle containers and collected approximately 51,000 pounds of recyclables. Four new water fountains have been installed with water bottle fillers to allow patrons to reuse water bottles and reduce one time use recyclables.

- Zone 3 promotes recycling by frequently updating information in kiosks throughout the parks within the zone. Zone 3 is also taking steps to comply with new restrictions enacted on recycling by reducing the number of regular trash receptacles and adding recycling containers in their place.
- To promote clean recycling within Zone 4, recycle cans are paired with trash cans. Our recycling efforts will soon become limited stream in an attempt to avoid contamination.
- Zone 5 has 34 recycling containers as well as 4 bottle filling water fountains.

Disseminating information by using signs, articles, and other media outlets

Robinson Nature Center

- The Robinson Nature Center facility educates the public about green technologies, sustainability, environmental stewardship, and techniques that can help reduce stormwater runoff, as well as reducing water and energy consumption:
- Stormwater mitigation is achieved on the property through a pervious concrete parking lot, four separate bioretention/rain gardens and a green roof. These items are highlighted on our LEED tours which we offer by group reservation as well as during special events throughout the year. The parking lot is vacuumed as needed during the year to maintain its pervious nature. Our maintenance staff monitors and maintains the plantings within the four bioretention areas. We have continued to provide annual maintenance of our rain gardens. The pervious concrete parking lot, green roof and rain gardens are also highlighted for visitors with interpretive signs.
- Interpretive signage in the building and on the center's grounds describe to visitors how different features reduce the environmental impact of the building by mitigating stormwater run-off and minimizing water and electricity use.
- A backyard demonstration area shows the public what they can do on their own properties to improve the management of water. Rain barrels demonstrate catchment of water for use in the garden and native plants demonstrate low-maintenance landscaping.
- The Chesapeake Bay exhibit (one of three permanent exhibits in the building) educates the public about water quality issues. A scaled reproduction of the Bay covering the floor of the exhibit allows visitors to walk the connections between Howard County and the Bay. Through interactive displays, visitors learn about the importance in restoring the native oyster population, how products they use can contribute to storm water runoff issues and how they can help save the Bay.
- We operate a touch tank filled with aquatic animals in our Children's Discovery room. This tank serves as an extension to our Chesapeake Bay watershed exhibit and further demonstrates how bodies of water are connected to surrounding land. Our educators and volunteers interpret the dependence of aquatic animals on our land use decisions that affect the quality of their habitat. Extensions of these concepts are also shared through discovery carts through which volunteers share stories and information about oysters and horseshoe crabs, two prominent species in the Chesapeake Bay, with our visitors.
- In FY2022, Robinson Nature Center served 14,251 visitors inside our building.

Promoting educational programs in schools, businesses, community associations

Natural and Historic Resources Division

Students Branching Out Program

- In the spring of 2013, the Howard County Recreation and Parks partnered with the Office of Sustainability to apply for a grant from the Chesapeake Bay Trust. The purpose of the grant was to combine efforts at improving water quality and stream health with student education. \$373,100 was

awarded to be used by June 30th, 2015 for the involvement of students in planting 6,300 trees on a total of 47.5 acres.

- In the fall of 2013 further funding was requested to expand the Students Branching Out project. An additional \$448,000 was granted to plant 8,000 more trees on 40 acres of school property and parkland by 2015. The Department of Public Works and the Howard County School System joined Recreation and Parks and Office of Sustainability to strengthen the outcome of the project by bringing together various areas of expertise.
- While the grant ended in 2015 The Department of Recreation and Parks and the Department of Community Sustainability want to continue planting efforts on school properties, partnering with teachers and students, as funding allows. Funding will come from Turf to Trees and Stream ReLeaf programs, so tree totals will be reported through those programs.
- **During the Spring of 2022, 38 trees were planted at Running Brook Elementary School, 62 at Patuxent Valley Middle School and 20 at Long Reach High School.**

<u>Year</u>	<u>Students Engaged</u>
Spring 2017	165
FY2018	125
FY2019	250
FY2020	240*
FY2021	0*
<u>FY2022</u>	<u>160</u>
Total	940

*Students not present Fall 2020 due to COVID and no plantings took place Spring 2021 due to the 17-year cicadas

- **Robinson On the Road Program**

In 2018, Robinson Nature Center began offering in-school/off-site programs. These programs allow us to reach a new demographic from schools that don't have the transportation, staffing or financial resources to take field trips to the Nature Center. Our 3-5th grade program called, "Virtual Power Tour" uses VR goggles to immerse participants into the world of renewable vs non-renewable energy practices. During the VR experience, participants travel to the bottom of the ocean floor, where they learn about oil extraction and discuss conservation of finite resources. **In FY2022, Robinson ran 20 of these programs, serving 414 students.**

- **Robinson Nature Center Treasure Chests**

In 2018, Robinson Nature Center began offering a variety of rentable education trunks including a Water Resource and Heritage, Nature Treasure Chest. This trunk provides renters with many educational activities, lessons, learning experiences, and water related artifacts, all centered around the many resources that the Chesapeake Bay provides. **In FY2022, Robinson rented out 4 nature treasure chests to local teachers.**

- **Robinson Nature Center MAEOE Green Leaders**

Green Leaders (Maryland Association for Environmental and Outdoor Educators, Trained Robinson Staff) work with Howard County Schools throughout the year, serving as a source of information and guidance for schools as they complete their Green School Application. A large portion of the Green School Application involves schools embracing student led, sustainable practices, which include Water Conservation/Water Pollution Prevention, Habitat Restoration, and Solid Waste Reduction, among others.

- **Robinson Nature Center Educator/Teacher Trainings**

In the spring of 2022, Robinson staff led two professional development trainings on early childhood emergent learning in-house. These curriculum trainings provide staff educators with strategies and lessons to engage young children in lessons focused on water conservation, habitat conservation, and ecology. There were a total of 6 participants.

Community Outreach/Partnerships

- **Volunteer Program:** Robinson's 190 Volunteers make a huge difference every day. They help with educational programs, gardening, teaching topics at Discovery Cart stations, photographing our programs, showcasing our live animals to the public, running our touch tank and allowing the public to touch animals such as sea urchins and sea stars, and helping staff with caring for our animals. Robinson Volunteers logged 1,720 hours in FY22, equating to a value of \$56,450.40.
- **Maryland Association of Environmental and Outdoor Education, MAEOE Youth Summit.** Robinson's Community, Outreach and Volunteer Liaison attended alongside our 2 HCPSS Teachers reaching 350 students, 60 teachers and obtaining signatures for our Eco Pledge on a banner.
- **Howard Astronomical League** – Continued collaborating on public programs, virtual engagement
- **Howard County Beekeepers** – Continued collaborating on programs, hive maintenance, training resources and honey sales.
- **Howard County Bird Club** – Continued collaborating on programs and Master Naturalist Training

5. Property Management and Maintenance

- Howard County shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County-owned municipal facility requiring NPDES stormwater general permit coverage. The status of pollution prevention plan development and implementation for each County-owned municipal facility shall be reviewed, documented, and submitted to MDE annually.*
- The County shall continue to implement a program to reduce pollutants associated with maintenance activities at County-owned facilities including parks, roadways, and parking lots. The maintenance program shall include these or MDE approved alternative activities:*
 - Street sweeping;*
 - Inlet inspection and cleaning;*
 - Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management through increased use of integrated pest management;*
 - Reducing the use of winter weather deicing materials through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making; and*
 - Ensuring that all County staff receives adequate training in pollution prevention and good housekeeping practices.*

The County shall report annually on the changes in any maintenance practices and the overall pollutant reductions resulting from the maintenance program. Within one year of permit issuance, an

alternative maintenance program may be submitted for MDE approval indicating the activities to be undertaken and associated pollutant reductions.

Annual Update Number 27 Status

Bureau of Environmental Services (BES)

County Facilities – Notice of Intent (NOI)

The County has identified and listed County owned and municipal sites needing a permit below. Stormwater Pollution Prevention Plans (SWPPPs) are reviewed annually, updated as necessary and placed in the associated SWPPP binder and on the shared drive.

County Landfills

As required by the industrial NPDES discharge permits, Howard County DPW monitors surface discharge from groundwater treatment systems. The County maintains General Industrial NPDES Discharge permits from MDE for New Cut and Carrs Mill landfills and an Individual Industrial NPDES Discharge permit with Stormwater for Alpha Ridge Landfill. Alpha Ridge Landfill is the only site under the NPDES permit that has stormwater requirements. The other two sites do not have stormwater requirements associated with their NPDES permits.

Alpha Ridge – The current State Discharge Permit #19-DP-3224, NPDES Permit #MD0067865 is effective as of 9/1/22 and will expire on 8/31/27. This permit requires Howard County to maintain coverage under Permit Registration Number 12SW3054A and any subsequent *General Permit for Discharges of Stormwater Associated with Industrial Activity*. The landfill is still active, but the majority of Howard County's solid waste is transferred out of state to Virginia. Alpha Ridge Landfill still buries a small amount of the overall waste generated within the County. The transfer station has been operational since September 2005. The installation of the groundwater remediation system was completed in 2000 and has been operating since that time.

Park Equipment Maintenance Shops and Fueling Facilities

The MDE Wastewater Permits Program has agreed that the following park maintenance shops and fueling facilities are not required to apply for coverage under General Permit 12-SW. However, Howard County will continue to implement the BMPs identified in the previous SWPPPs at these sites.

- Cedar Lane Park Equipment Maintenance Shop
- Centennial Park Equipment Maintenance Shop
- Corridor Road Fueling Facility
- Rockburn Branch Park Equipment Maintenance Shop
- Savage Park Equipment Maintenance Shop
- Schooley Mill Equipment Maintenance Shop
- Western Regional Park Equipment Maintenance Shop

County Facility Wash Racks

In August 2011 a review of vehicle washing efforts at County fire stations, police stations, and several County parks identified the need for better treatment for vehicle wash water, in particular when vehicles are washed outside.

As part of the design the County harvests rainwater for use in vehicle washing operations. Construction is complete at the Alpha Ridge Landfill and all seven fire and police station locations. Design is complete for two park locations and construction will start in late 2022. The entire budget for design and construction is approximately \$4.8 million.

See list below of the status of all the vehicle wash pad/rainwater harvesting systems.

Table 4: Howard County Vehicle Wash Pad/Rainwater Harvesting Sites

Facility	Address	Vehicle Washing	Industrial Activities
Alpha Ridge Landfill	2350 Marriottsville Rd Marriottsville, MD	Y - wash water is directed to sanitary sewer	Y - SWPPP
Banneker Fire Station (#7)	5815 Banneker Rd Columbia, MD	Y - indoors only	N
Bethany Fire Station (#8)	9601 Old Frederick Rd Ellicott City, MD	Y - wash water is directed to sanitary sewer	N
Cedar Lane Park Maintenance Shop	5081 Cedar Lane Columbia, MD	N (washpad design complete)	N
Centennial Park Maintenance Shop	10000 Route 108 Ellicott City, MD	N (vehicles are washed at Recreation & Parks Headquarters wash bay)	N
Central Maryland Transit Operations Facility	8800 Corridor Rd. Annapolis Junction, MD	Y - indoors only	Y - SWPPP
Clarksville Fire Station (#5)	5000 Signal Bell Lane Clarksville, MD	Y - indoors only	N
Cooksville Maintenance Shop	14212 Frederick Rd Cooksville, MD	Y - wash water is captured and trucked to WWTP	Y - SWPPP
Dayton Maintenance Shop	4301 Route 32 Dayton, MD	Y-wash water is captured and trucked to WWTP	Y - SWPPP
Elkridge Fire Station (#1)	5700 Rowanberry Drive Elkridge, MD	Y-washwater is directed to sanitary sewer	N
Ellicott City Fire Station (#2) Ellicott City, MD	4150 Montgomery Rd Ellicott City, MD	Y - wash water is directed to sanitary sewer	N
Glenwood Fire Station (#13)	14620 Carrs Mill Rd Woodbine, MD	Y - wash water is captured and trucked to WWTP	N
Long Reach Fire Station (#9)	5950 Tamar Drive Columbia, MD	Y - wash water is directed to sanitary sewer	N
Little Patuxent Water Reclamation Plant	8900 Greenwood Place Savage, MD	Y - wash water is directed to sanitary sewer	Y - SWPPP

Mayfield Maintenance Shop	7751 Mayfield Ave. Elkridge, MD	Y - wash water is directed to sanitary sewer	Y - SWPPP
Public Safety Training Center	2200 Scott Wheeler Dr Marriottsville, MD	Y – wash water is directed to sanitary sewer	N
Recreation & Parks Headquarters	7120 Oakland Mills Rd Columbia, MD	Y - indoors only	Y - SWPPP
Ridge Rd. Maintenance Shop	8800 Ridge Rd. Ellicott City, MD	Y - indoors only	Y - SWPPP
Rivers Park Fire Station (#10)	10155 Old Columbia Rd Columbia, MD	Y- wash water is directed to the sanitary sewer	N
Rockburn Branch Park Maintenance Shop	6105 Rockburn Branch Park Rd. Elkridge, MD	N	N
Savage Fire Station (#6)	8521 Corridor Rd Savage, MD	Y - wash water is directed to sanitary sewer	N
Savage Park Maintenance Shop	8400 Fair St. Savage, MD	N	N
Scaggsville Public Safety Complex (#11)	11226 Scaggsville Rd Laurel, MD	Y - washwater is directed to sanitary sewer	N
Schooley Mill Park Maintenance Shop	12975 Hall Shop Rd Highland, MD	N (washpad design complete)	N
Utilities Maintenance Shop	8250 Old Montgomery Rd Columbia, MD	Y - wash water is directed to sanitary sewer	Y - SWPPP
West Friendship Fire Station (#3)	12535 Old Frederick Rd Sykesville, MD	Y - wash water is captured and trucked to WWTP	N
Western Regional Park Maintenance Shop	15040 Carrs Mill Rd Woodbine, MD	N	N

County Wastewater Treatment Plant (LPWRP)

There were no reportable spills from July 1, 2021, through June 30, 2022.

There were 128,250,000 gallons of Reclaimed Water sent to the National Security Agency from July 1, 2021, through June 30, 2022.

Annual Inspections

Plant inspections for the SPCC Plan are completed on a bimonthly schedule by EA Engineering in conjunction with plant personnel. Any significant findings are reported to the Bureau of Environmental Services with corrective actions and follow-up correspondence. Each inspection is scanned and saved at LPWRP.

There were 11 deficiencies across eight (8) tanks. Below are a couple items that were noted and fixed:

- Seven (7) of the deficiencies across the 7 tanks were for new signs with the capacity of the tanks.

- Three (3) were for restocking the spill kits for Tanks 019A, 020A, and 021A.
- The last was for Tank 018A for being too close to the wall of the building. The tank was relocated to be in compliance.

Plant inspections for the SWPPP are completed on a quarterly basis. All findings are recorded, and reports are sent to Environmental Services and saved at the LPWRP. Sampling was done during the 2nd quarter 2022. Below are items that were addressed:

- There were no items that needed remediation.

Pollution Prevention and Good Housekeeping Practices Training

For all industrial permits listed below, SWPPPs have been developed for each site and employees are trained annually, at minimum. Each year County staff is required to attend training which includes the SPCCs, the SWPPPs, IDDE and handling hazardous wastes. The training programs are provided online.

The following inspections are conducted at the facilities covered by the industrial permits:

- Alpha Ridge Landfill
 - Weekly inspections of drainage areas which include un-stabilized landfill areas, active land application areas, material storage, and waste exposed to precipitation.
 - Monthly inspections of the rest of the drainage areas.
 - Quarterly facility inspections of the entire site.
 - Quarterly visual monitoring inspections of flow from each outfall. This was required to start in the first full quarter after the County was notified of coverage under 12-SW, which was the fourth quarter of calendar year 2015.
 - Quarterly Benchmark monitoring of the outfalls from drainage areas that include Sector L: Landfill and Land Application Sites, and Sector C: Chemicals and Allied Products (the composting facility). Benchmark monitoring was required to begin in the first full monitoring period six months after the County was notified of coverage under 12-SW, which was the second quarter of calendar year 2016. With MDE approval, benchmark monitoring was discontinued at three outfalls in the Sector L drainage area because they had met all the benchmark values. Therefore the County now monitors only one outfall for Total Iron and TSS.
 - Annual Comprehensive Site Compliance Evaluation (CSCE or Annual Inspection) of the entire site.
- All Other Sites
 - Quarterly facility inspections of the entire site.
 - Quarterly visual monitoring inspections of flow from each outfall.
 - Annual Comprehensive Site Compliance Evaluation (CSCE or Annual Inspection) of the entire site.

Reports of the inspections described above are included as narrative files included with the geodatabase.

Bureau of Highways (BOH)

The Bureau of Highways (BOH) is responsible for addressing a number of issues concerning pavement, sidewalks, storm drains, and trees along more than 1,000 miles of County roads for the convenience and safety of the public. This work includes rehabilitation and preservation efforts such as sidewalk repair/replacement, road crack-sealing,

storm drain and culvert installation, repair and replacement, as well as tree trimming. In addition, the BOH engages in remedial efforts such as removing snow from County roads and filling potholes. Some of the areas of operation that the BOH has focused on during the current permit year are described below.

Street Sweeping

The BOH has continued performing street sweeping with the assistance of a private contractor. Street sweeping occurs on 806 miles of the County's approximately 1,376 miles of curbed roadways. During the period of July 1, 2021, through June 30, 2022, the BOH collected approximately 582.24 tons of street debris via street sweeping. Each street is swept three to four times a year. Each sweeping cycle takes from six to nine weeks to complete. Cycles generally begin in the months of January, April, July and September. In general, each cycle begins in the east part of Howard County and moves westward.

Inlet and Pipe Cleaning

The BOH cleans and repairs storm drain inlets and pipes as needed or as complaints are reported. This work is performed by County staff and contractual services throughout the year. The County also uses a Vactor truck for cleaning storm drainpipes and inlets. Additionally, in the fall, the County removes leaf litter from storm drain inlets as needed.

Table 5: FY22 Inlet and Pipe Cleaning

Work Performed	Amount
No. of Inlet Repairs	20
No. of Inlet Cleaned	2,529
Amount of Debris from Inlet (pounds)	87,262
No. of Pipe Replacements	6
No. of Pipes Cleaned	2
No. of Drainage Swales Cleaned	4

Pesticides, Herbicides and Fertilizer

The County continues to minimize the amount of pesticides, herbicides and fertilizer used. The chemicals listed in the Chemical Application Associated Table of the geodatabase were used to control vegetation along the county's guard rails.

Snow and Ice Removal

The BOH continues to utilize and update AVL and GIS technology to record where and when de-icing and anti-icing chemicals were applied on county roads during winter storm events. This minimizes the possibility of inadvertent multiple applications of deicing chemicals. The chemicals listed in the Chemical Application Associated Table of the geodatabase were used to for deicing the County's roads in FY22 during nine separate events. According to the Baltimore, MD, Snowfall data available from the National Weather Service Forecast Office for the Baltimore/Washington area, Howard County received approximately 14.4 inches of snowfall during the 2021-2022 winter season. MD Snowfall data are available online at:

<http://www.weather.gov/media/lwx/climate/bwisnow.pdf>.

Snow and Ice Removal Training

The BOH holds a Snow Rodeo event every October which Highway staff are required to participate. At this event staff use their skills to navigate through a course for them to drive a full-size snowplow through narrow pathways while missing all obstacles. In addition to missing obstacles the crews practice backing up without hitting barriers, pushing a log into a designated slot and practice safety procedures. This event is a fun activity that also allows the County snowplow/salt truck drivers to hone their skills and make them safer and more efficient during actual snow/ice events.

Department of Recreation and Parks (DRP)**Street Sweeping (RNC)**

The parking lot at Robinson Nature Center is vacuumed as needed during the year to maintain its pervious nature. Our maintenance staff monitors and maintains the plantings within the four bioretention areas.

Inlets Inspection and Cleaning- Park Operations

Zone 1 staff maintains a variety of inlets, storm drains, and swales within their respective sites. There are over 40 storm drains that are located within Zone 1. Zone 1 has 9 Bio-retention ponds within park boundaries, most of which are located adjacent to or on paved areas. These retention ponds require maintenance care to remove invasive plants, trash, and debris. Staff assists DPW with this collective effort to insure proper function of these retention areas. 120 hours are spent in this effort annually.

Zone 2 has spent 124 hours annually to inspect and clean forty-one inlets receiving drains to maintain storm water systems on park land. Large inlets/storm water pipe outflows are cleared by Department of Public Works, where the scope of work is beyond our capabilities.

In **Zone 3**, The Highway Department Pond Crew comes out bi-annually to mow and remove the woody growth from the storm water pond area and swales. Park staff conducts quarterly inspections, approximately 12 hours a year, to check for holes created by burrowing animals, and to ensure there is no evidence of run off from sediments. Inlet box condition are also part of the inspection process.

Zone 4 spends an average of 120 hours per year (10 hours per month) on inlet inspection and maintenance at Rockburn Branch Park and several community parks. Troy Hill Park, with its addition of numerous bioretention ponds and swales throughout the most recent phases of construction have required over 400 man-hours of maintenance since this time last year. Maintenance on the bioretention structures at Troy Hill Park have been completed by Zone 4 employees and the Land Management Division.

Zone 5 has 12 Bio retention ponds which must be maintained throughout the year through weeding and mowing operations. Sewell's Orchard pond are inspected and maintained daily. Over 300-man hours are required each year for maintenance of these areas.

Pesticides, Herbicides and Fertilizer

The Department of Recreation and Parks has eliminated the use of Glyphosate. Mechanical means are used to remove weeds in curbs, sidewalks, and parking lots.

The Park Operations Division is adhering to recommended fertilizer use requirements in compliance with Maryland Department of Agriculture. Park Managers are tailoring custom management plans for individual fields

based on soil analysis. By incorporating granular slow-release nutrients that are dictated by analysis results, managers now have the flexibility to modify and limit inputs to precisely what is necessary for resilient turf.

Zone 1

In 2021 IPM practices were initiated with increased aeration, 320 tons of topsoil/top dressing applied to sports field natural turf areas. With sports events and activities being cancelled due to pandemic restrictions in 2020/2021 natural turf area soil compaction and erosion were eliminated. This allowed for thick and vibrant growth of turf stands eliminating herbicide and pesticide applications completely. Overseeding applications were reduced 50% to one application in fall with a cost savings of \$6,500.00 in turf stand field renovations.

Zone 2

Pesticide usage has been reduced by 50% in regional and community parks. Glyphosate is no longer being used by the Department. Alternative organic solutions are being tested by the Department. Problematic landscape beds were removed, and landscape fabric was installed to reduce frequent herbicide applications. Additionally, Zone 2 has been using mechanical equipment for removal of weeds in curbs and sidewalk areas. As part of the Zone 2 turf management plan sports field, high traffic lawn space and grass overflow parking lots are slice aerated monthly to relieve soil compaction, increase water and oxygen intake and increase plant and root health without the need of addition fertilizer applications.

Zone 3

Staff manually removes and spot sprays invasive weeds. Pesticide usage has been reduced by 30% at regional and community parks with no usage of Glyphosate.

- Certified Pesticide Applicators attend a yearly Pesticide Update run by the State.
- Registered Pesticide Applicators attend an "In-House" Pesticide Training annually.
- Certified Nutrient Applicators attend yearly Nutrient Update run by the State.

Zone 4

Staff makes every effort to hand pull or trim weeds to reduce or eliminate the use of herbicides. An additional 300 hours of labor have been necessary to control weeds as a result of the changes.

- Certified Pesticide and Nutrient Applicators attend an annual update through the Maryland Turf Council that covers both certifications.
- Registered Pesticide Applicators attend an "In-House" Pesticide Training annually.

Zone 5

Staff has reduced its pesticide usage to only extreme circumstances involving thistle. All other weeding is done manually. No fertilizer has been used in the zone.

Snow and Ice Removal

Park Operations used motorized equipment, hand tools, and ice-melt materials to clear snow and ice from park roadways, pathways, ball courts, and school pathways. When possible, an organic corn-cob derivative product called "Dri-Zorb" is used in place of granular calcium chloride

School pathway deicing efforts have been handed over to one crew. This crew has been trained in the proper calibration of the equipment used. The formation of this crew has reduced wasted materials as there is one sole group focused on all the areas and they are able to monitor the walks more closely and effectively which maximizes efficiency.

No Idle Zone- RNC

In November 2020 Robinson Nature Center implemented a No Idle Zone in our front parking loop. We installed two signs provided as part of this MDE initiative. In all letters confirming field trip bookings, we explained the no idle zone and asked that bus drivers be reminded to turn off their engines while loading and unloading children on field trips. We have also notified and trained all staff to adhere to the No Idle Zone.

Pollution Prevention and Good Housekeeping Practices

- Staff attend annual Site Environmental workshop.
- Staff adhere to all standards regarding hazardous material handling and spill response.
- Regular inspections of material storage and spill remediation are conducted through Clean Harbors. This is intended to identify and improve social, economic, and environmental impacts. Adherences to these standards help prevent the release of hazardous material into the environment.
 1. Centennial Maintenance Shop has installed four spill clean-up stations to collect fluid spills from equipment leaks and fluid fill areas. Vehicles are equipped with small spill kits for spills that could potentially occur during transport of small fluid containers. A monthly SWPPP report is filed with the Waste Management Division. 1,000 pounds of spill waste has been collected and removed from the Maintenance Shop since implementing the stations. (Note- this total reflects a 750-pound reduction in the spill waste from previous year.)
 2. Vehicles and equipment are cleaned off site at designated facilities equipped with wash bays reducing runoff from park operation maintenance sites.
 3. SWPPP are in place for the Schooley Mill Park and Western Regional Parks Maintenance Facilities. This is a monthly inspection/report to monitor water runoff from the maintenance yards. This also includes yearly inspection on the condition of the sediment ponds and inlet boxes affiliated with these maintenance yards.
 4. SWPP (Storm Water Protection Plan) is in place to ensure that run-off around the maintenance shops are eliminated. The plan was created by Environmental Services who conduct inspections 2 times a year and trains staff on proper protocols for maintenance and vehicle cleaning.
- The Zone cleans paint machines in proper locations, and turf carts vs trucks whenever possible; all spills are properly cleaned up and pig mats are used when we are aware of machine leaks.

6. Public Education

Howard County shall continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the County's activities. These efforts are to be documented and summarized in each annual report. The County shall continue to implement a public outreach and education campaign with specific performance goals and deadlines to:

- a. ***Maintain a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.***
- b. ***Provide information to inform the general public about the benefits of:***
 - i. ***Increasing water conservation;***
 - ii. ***Residential and community stormwater management implementation and facility maintenance;***
 - iii. ***Proper erosion and sediment control practices;***
 - iv. ***Increasing proper disposal of household hazardous waste;***

- v. *Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal, cash for clippers, etc.);*
 - vi. *Residential car care and washing; and*
 - vii. *Proper pet waste management.*
- c. *Provide information regarding the following water quality issues to the regulated community when requested:*
- i. *NPDES permitting requirements;*
 - ii. *Pollution prevention plan development;*
 - iii. *Proper housekeeping; and*
 - iv. *Spill prevention and response.*

Annual Update Number 27 Status

Compliance Hotline

The Howard County website posts a Hotline number, (410) 313-6447, which residents can call to reach the Bureau of Environmental Services. Managers and inspectors responsible for the County's IDDE program respond to these calls within 24 hours, Monday through Friday. Complaints that come in during the weekend are referred to 911 or the 24-hour MDE Spill Hotline at (866) 633-4686.

Complaints include but are not limited to illicit discharges, dumping, and spills. All complaints are kept in a database. The County website also hosts an illicit discharge form that visitors can fill out and send directly to the manager of the IDDE Program. In addition, the County also is part of Tell HoCo, a customized SeeClickFix smartphone application that allows anyone in Howard County to report an illicit discharge directly to the IDDE Manager.

Increasing Water Conservation

Robinson Nature Center

- The Robinson Nature Center, in operation since September 2011, serves as a model of innovative water conservation methods and officially received its LEED Platinum certification by the USGBC in 2012. Innovative water conservation methods incorporated into the building and property include:
- Efficient Landscapes including four rain gardens and a green roof all utilizing indigenous and perennial plants. Native plantings planted throughout the property including in the center's backyard demonstration area serves as an educational model for residents. Existing native plantings continue to be monitored, maintained through regular volunteer weeding events and replaced as needed when predation occurs. These plantings reduce the need for irrigation, pesticides, herbicides, etc., while providing a habitat for wildlife.
- Working with local nurseries and volunteers, the center planted almost 300 new native trees and shrubs along hillsides and surrounding portions of the trail to further enhance soil stabilization in these areas.
- Storm drains located along the Cedar Lane entrance of the Nature Center have "Chesapeake Bay Drainage" stenciled onto them, helping to educate visitors and passersby about the importance of proper disposal of pollutants that could affect local waterways and wildlife.
- Since 2012, the Nature Center had participated as a host site for "Project Clean Stream", a
- Baltimore regional stream and watershed clean-up effort. During FY22, and still operating under COVID-19 guidelines we were able to arrange a successful clean-up day with volunteers. 10 volunteers assisted Nature Center staff in removing 90 lbs. of trash. Litter was removed from the flood plain, bordering open

space land, and from debris that has accumulated and washed downstream from heavy rainfalls into the Middle Patuxent River.

- Using the building as a teaching tool – the Robinson Nature Center facility educates the public about green technologies, sustainability, environmental stewardship, and techniques that can help reduce stormwater runoff, as well as reducing water and energy consumption. Water use reduction is achieved in the publicly accessed spaces of the building using waterless urinals and high efficiency toilets and faucets.
- Stormwater mitigation is achieved on the property through a pervious concrete parking lot, four separate bioretention/rain gardens and a green roof. These items are highlighted on our LEED tours which we offer by group reservation as well as during special events throughout the year. The parking lot is vacuumed as needed during the year to maintain its pervious nature. Our maintenance staff monitors and maintains the plantings within the four bioretention areas. The pervious concrete parking lot, green roof and rain gardens are also highlighted for visitors with interpretive signs.
- Interpretive signage in the building and on the Center's grounds describe to visitors how different features reduce the environmental impact of the building by mitigating stormwater run-off and minimizing water and electricity use.
- A backyard demonstration area shows the public what they can do on their own properties to improve the management of water. Rain barrels demonstrate catchment of water for use in the garden and native plants demonstrate low-maintenance landscaping.
- The Chesapeake Bay exhibit (one of three permanent exhibits in the building) educates the public about water quality issues. A scaled reproduction of the Bay covering the floor of the exhibit allows visitors to walk the connections between Howard County and the Bay. Through interactive displays, visitors learn about the plight of oysters, how products they use can contribute to storm water runoff issues and how they can help save the Bay.
- A touch tank filled with sea creatures is in our Children's Discovery room. This tank serves as an extension to our Chesapeake Bay exhibit and further demonstrates how bodies of water are connected. Our educators and volunteers interpret the dependence of aquatic animals on our land use decisions that affect the quality of their habitat. Extensions of these concepts are also shared through docent carts through which volunteers discuss oysters and horseshoe crabs, two prominent species, in the Chesapeake Bay.
- In FY2022, Robinson Nature Center served 14,251 visitors inside our building.

Environmental Quality Incentives Program (EQIP)

The USDA, NRCS continued to work with the HSCD to administer EQIP, the main conservation cost-share program available to farmers and farm owners from the federal agriculture department. The following practices were installed in the County through this program:

- (2) 2.6 acre Forage and Biomass Planting
- (3) 12 each Watering Facility
- (3) 3087 linear feet Livestock Pipeline
- (1) 1 each Sediment Control Pond
- (3) 90.6 acre Prescribed Grazing
- (1) 153 linear feet Animal Trails and Walkways
- (1) 140 linear feet Stream Fencing
- (1) 4.4 acre Critical Area Planting
- (1) 4.4 acre Mulching
- (2) 0.03 acre Heavy Use Area Protection
- (1) 100 linear feet Lined Waterway or Outlet
- (1) 1 each Stormwater Runoff Control

Practices Completed with State or Local Cost Share or Without Cost Share Assistance

These practices were completed with technical assistance from the HSCD. Some projects received cost sharing from either Maryland Agriculture and Water Quality Cost Share (MACS) program or Patuxent Reservoirs Watershed Protection Group local cost-share program while other practices received no cost-share.

(12) 2478 acres Cover Crop

(2) 2058 linear feet Stream Fencing

Conservation Planning

In providing technical assistance, the HSCD writes conservation plans. Plans are also written for land that is proposed for the agricultural land preservation program. Also, existing preservation parcels have conservation plans that may be updated. There were 34 new conservation plans on 4109 acres and 5 revised conservation plans on 613 acres written by the HSCD office.

Environmental Stewardship

Through a partnership with the National Security Agency (NSA), Howard County Little Patuxent Water Reclamation Plant (LPWRP) is delivering highly treated wastewater (reclaimed water) to be utilized as cooling water for national security technology. Much of the water will be evaporated during the cooling process. There were 128,250,000 gallons of Reclaimed Water sent to the National Security Agency from July 1, 2021, through June 30, 2022.

Discussions are on-going with other industrial facilities to utilize reclaimed water for process use which would replace potable water. Additionally, an engineering study has begun to design a reclaimed water distribution system to deliver reclaimed water to those industries.

A carbon-neutral power backup system was created at the Plant, which includes the combination of solar panels and diesel generators to ensure the Plant operates in all weather conditions and avoids potential overflows.

LPWRP personnel attend the Howard County Fair and Howard County GreenFest to hand out information on the treatment plant and on how to keep the sewers from getting clogged and causing overflows. This information includes proper disposal of grease, which is a consistent cause of sewer flow issues; proper disposal of prescription drugs; and a “Do Not Flush” campaign for disposable baby wipes.

Stormwater Management – The effort that began in 2016 to review, rehabilitate, and update the stormwater collection system on the LPWRP property was continued in FY2019.

- January 2019 - Highways crew cleaned swales and cleared storm drainpipes along perimeter road.
- April 2019 – HTI completed replacement of storm drainpipes A and P; installed rip raps on outfalls Q, I, J & K; removal of sediment accumulation on one of the three (3) culvert pipes.
- May 2019 – Maintenance crew removed sand and clay from new trench drains.

Residential and Community Stormwater Management Implementation and Facility Maintenance

Rain Barrel Program

The SWMD generally provides residents with free barrels through the County’s Rain Barrel Program. Pre-drilled rain barrels are available free of charge to residents who attend seminars, either at the Alpha Ridge Landfill or at the County’s GreenFest event in April. This year, due to COVID-19 restrictions, training and sign-up for pickup was online. Pickup of barrels were either at GreenFest in April, or from the Alpha Ridge Landfill.

Forty rain barrels were given away at GreenFest in FY22, and 98 rain barrels were given away at the Alpha Ridge Landfall.

Residential Pool Discharge

Howard County mailed out three letters to residential pool owners advising them of the requirements for draining pools (correct pH, drain slowly, and lower disinfection levels to less than 0.40 mg/L).

Middle Patuxent Environmental Area (MPEA)

- The MPEA Integrated Natural Resources Management Plan for the 1,021-acre environmental area was initially drafted in June 2000 and was last updated in January 2022. The plan outlines strategies, techniques and protocols for environmental education and research, Nature-related recreation, natural resources management, and administration. The plan is updated annually.
- The implementation of the plan's projects and programs in FY2022 has included the following accomplishments:
- 1,296 volunteer hours were spent maintaining 5 ½ miles of trails, conducting wildlife surveys and monitoring, controlling invasive exotic vegetation, planting native trees and shrubs, propagating native plants for habitat restoration projects, developing a Pollinator StoryWalk Program, and assisting with the managed deer hunts in the MPEA.
- Implementation of the MPEA Woodcock Habitat Management Plan to restore breeding habitat for American woodcock and other early successional species within the Middle Patuxent River watershed continued as an ongoing project in FY2022. In addition, invasive species in understory areas are being systematically removed and replaced with native understory species. In fall 2021 and spring 2022, an additional 228 native trees & shrubs and 510 native perennials were planted in habitat restoration areas to replace removed invasive species. Maintenance included ongoing invasive species control and winter meadow mowing.
- MPEA staff and volunteers worked to maintain native tree and shrub planting sites from previous seasons. Tree shelter maintenance, invasive removal and monitoring was conducted on 3,068 native trees and shrubs previously planted in MPEA stream buffers and upland habitats.
- The MPEA Independent Trail Maintenance Team volunteer program and group trail work events contributed 402 hours in FY2022, with much of the time being spent on trail brushing and, on the installation, and maintenance of drainage and erosion control structures. Check dams and water bars were installed and maintained along trails through riparian areas where trail erosion was evident.
- A total of 620 volunteer hours were contributed to the removal of non-native, invasive plant species and replanting of native trees, shrubs, and perennials within the environmental area.
- MPEA staff completed a systematic evaluation of all 35 storm drain outfalls within the environmental area in 2010, and in 2011 an additional 38 storm drain outfalls outside but impacting the area were inspected. Outfalls were placed into severity rating categories as follows: 1 – fairly good (about 50%), 2 – slight to moderate erosion (17%), 3 – slight to moderate erosion with severe stream bank erosion downstream (14%), 4 – moderate to severe erosion; unstable; some impact to infrastructure (14%), 5 – infrastructure damaged/under repair (5%). During the evaluation, one storm drain outfall with severe erosion and infrastructure damage was referred to the Storm Water Management Division and was repaired in 2012 using a regenerative stormwater conveyance design. This project now serves as a demonstration site for innovation in SWM techniques. In 2013, MPEA staff trained volunteers from the Middle Patuxent Environmental Foundation to repeat the original storm drain outfall surveys. 2013 data was compared to the baseline data from 2010 in order to monitor whether the outfalls were stable or if the erosion was progressing and to recommend actions to minimize future erosion. In FY2019, an additional outfall stabilization project was completed at Bright Passage. In FY2022, MPEA staff continued to monitor SDO's

for erosion, as well as monitoring the three repaired SDO's at New Country Lane, Great Oak Way, and Bright Passage for function, tree planting success, and invasive species control.

Howard County Recreation & Parks – Natural Resource Conservation Section – Trails Program

- Howard County Recreation & Parks manages approximately 10,000 acres of park and open space lands. There is currently sixty (60) of natural surface trails and forty-two (42) miles of paved pathways maintained by the Department. In 2017, a Trail Planning and Management Guide was created by the Department to offer consistency to the entities within the County who contribute to the planning, design, construction, and management of natural surface trails.

FY22 Accomplishments

- The Trail Care Crew hosted 11 volunteer trail workdays at David Force Park and 1 volunteer event at Rockburn Branch Park's Mountain Bike Skills Park. Seventy-nine (79) volunteers participated and contributed 316 hours to complete 3,720 linear feet of new, sustainably aligned trail corridor and other trail maintenance tasks.
- The long awaited Haviland Mill trail project in Clarksville commenced in August 2021. When completed, this project will consist of 1,250 feet of natural aggregate stone surface trail, accessible boardwalk, bridges, and trail head area.
- The Trail Care Crew and Park Staff began the repair of trail segment 11C at Rockburn Branch Park in September 2021. This project includes the re-alignment of 660 linear feet of trail, the closure of 430 linear feet of old, unsustainable trail, construction of two (2) twenty-foot-long boardwalks, the planting of sixty trees and shrubs in the old trail corridor, and the elevation of 811 linear feet of aggregate stone trail.
- The Trail Care Crew completed an assessment of 5.0 miles of natural surface trail at Schooley Mill Park in February 2022.

Commercial/Non-residential

Commercial Credit and Reimbursement Program

During this time period, the Office of Community Sustainability continued the commercial credit and reimbursement program. Eligible property owners were awarded a credit against the Watershed Protection Fee for on-site stormwater management. Before the July 2022 Fee was issued, 70 commercial properties had been approved for credit. There have been no commercial reimbursements granted to date.

Commercial Stormwater Solutions Work Group

In the spring of 2016 the Howard County Executive formed a work group of commercial property owners, consulting engineers, commercial property managers, and the University of Maryland Environmental Financing Center. Staff continues to pilot some of the recommendations of the 2016 Commercial Stormwater Work Group. In 2018, the County partnered with Wal-Mart in Ellicott City to retrofit their stormwater pond with continuous monitoring and adaptive control technology. Wal-Mart contributed almost ¼ of the costs toward the project and became the pilot project in the County's Commercial Stormwater Solutions Partnership Program. The County is using this partnership as a model and reaching out to other commercial property owners for more stormwater retrofit partnerships. The County developed relationships with several commercial property owners in regards to their ponds and is in the process of pursuing retrofits for three ponds within a business park through this partnership.

Non-Profits

Watershed Protection Partnership

During this period, the Office of Community Sustainability continued the Non-Profit Watershed Protection Partnership (NPWPP). In this Partnership, the County grants a 100% credit to non-profits in exchange for the ability to assess for and implement stormwater management projects on their properties. This program not only accomplishes impervious surface management, but also involves key stakeholders in the stormwater remediation problem, thus increasing public buy-in. There are 238 parcels in the NPWPP, which totaled to approximately \$154,080 of Watershed Protection Fee credits during fiscal year 2021. The County continues to work with nonprofit partners to implement and retrofit stormwater facilities as finances allow.

Community Stormwater Partnership Grant

In spring of 2022, the County announced a Community Stormwater Partnership Grant. The grant will provide funding to homeowner's associations and nonprofits within the community to design, install, and provide outreach for stormwater management. Awards will be made in summer 2022.

Residential

CleanScapes & Rain Gardens for Clean Water (RG4CW)

Since an estimated 40% of impervious surface in Howard County is located on residential properties, a residential stormwater program was created. The CleanScapes program, administered by the Office of Community Sustainability, offers County residents reimbursement for installation of stormwater Best Management Practices (BMPs) and credit toward the Watershed Protection Fee. During fiscal year 2022, \$219,440.25 in reimbursements were granted to 43 residents. At the end of fiscal year 2022, a total of \$5,782.86 was credited to 241 residents on their Watershed Protection and Restoration Fee. The CleanScapes program also includes periodic public events and promotional materials to improve public education and buy-in. By the end of fiscal year 2022, approximately 7.1 acres of impervious surface were treated by stormwater BMPs on residential lots through the CleanScapes program.

FY21 was the last year of the Rain Gardens for Clean Water (RG4CW) program; Howard County combined CleanScapes and RGCW into one program. Over the lifetime of the RG4CW program we have installed 64 gardens treating 1.84 acres of impervious. On June 1st 2020 the County Council passed a resolution to increase the reimbursement rates for installing stormwater practices. This increase includes increased maximums for all practices and covers 75% of the project cost, where it was previously 50%.

Septic Savers

The Office of Community Sustainability (OCS) coordinated with the Health Department, Bureau of Utilities and the staff at the water treatment plant to develop the Septic Savers Program that promotes proper septic maintenance. Residents can go to the County's website to learn about the benefits of properly maintaining their septic tanks and can request a \$100 reimbursement when they pump their septic tank every 3-5 years. Septage hauling records from the treatment plant, along with invoices from the haulers are used to verify the residents' request for reimbursement. During FY21, 718 residents received the reimbursement.

Proper Erosion and Sediment Control Practices

Construction Inspection Division

The Construction Inspection Division (CID) responds to citizen complaints as they relate to development projects under construction. Often when addressing citizen complaints, it becomes a public education opportunity describing the situation, and BMP practices used to address their concerns as they relate to stormwater are explained.

Soil Conservation District

When county residents who reside on private property are having issues with erosion and/or drainage, the Soil Conservation District staff can be contacted. A District staff member can discuss the issues with the residents and offer solution options for their consideration.

Increasing Proper Disposal of Household Hazardous Waste

The County provides a multifaceted approach to proper management and diversion of household generated hazardous waste. These includes a brochure and web page highlighting what is accepted at the County's permanent drop off program at Alpha Ridge Landfill Resident's Convenience Center, along with ways to minimize through safe alternative products other than standard household chemicals. Brochures are available at County buildings and libraries. During the reporting period over 425,000 pounds of hazardous waste was collected from over 9,700 residents at the Alpha Ridge Landfill Resident's Convenience Center.

Improving Lawn Care and Landscape Management

Compost Demonstration Program & Compost Bin Give-Away

Howard County Master Gardeners held free compost demonstrations and lessons throughout the County, attendees were instructed on how to create and manage their own backyard compost piles. Howard County's Recycling Division provides free compost bins to residents at these demonstrations, and additionally makes them available for pickup at the Alpha Ridge Landfill Resident's Convenience Center and the Bureau of Environmental Services office in Columbia. Approximately 520 compost bins were distributed in FY22. Additionally, staff at Robinson Nature Center, Roger Carter Community Center and Miller Library actively compost food scraps generated by staff.

Stream ReLeaf

The Stream ReLeaf Program was initiated by the Howard County Stormwater Management Division (Department of Public Works) in 2003 as part of the implementation of the Little Patuxent River Watershed Restoration Action Strategy. The Program has grown and expanded in scope significantly over the years and is now managed by the Natural Resources Division of the Department of Recreation and Parks.

Stream ReLeaf is a program designed to enhance riparian (stream) buffers by providing free native trees and shrubs to homeowners. The homeowner commits to planting the trees and shrubs on their property and the County delivers the requested plants. Requirements for the program are as follows: the area that the homeowner is willing to plant must be within 75 feet of a stream (right of ways are not eligible); and the homeowner must commit to planting at least 12 trees. Past performance is presented in the table below.

Table 7: Stream ReLeaf Summary

Year	Number of Participants	Number of Trees Planted

CY 2003	8	103
CY 2004	15	468
CY 2005 ¹	1	150
CY 2006	37	1,374
CY 2007	31	1,208
CY 2008 ²	28	709
CY 2009	25	1,908
CY 2010 ³	11	367
CY 2011	81	1,780
CY 2012	32	1,166
CY 2013	69	2,353
CY2014	55	2,281
CY2015- FY2016	32	1150
FY2017	13	700
FY2018	9	479
FY2019	12	584
FY2020 *	9	1,304
FY2021 **	4	360
FY2022	15	888
Total	487	19,332

*No spring 2020 plantings due to COVID-19

**No Spring 2021 plantings due to cicadas

Turf to Trees

The Turf to Trees program was created in 2016 and is a partnership between the Department of Recreation and Parks and the Office of Community Sustainability. The goal of the program is to aid property owners of lots sized 1.5 to 10 acres with little canopy coverage to convert lawn to forest. The Department of Recreation and Parks meets with interested homeowners to create a planting plan, species list and map out the boundaries of the planting. The County provides the trees and planting labor to qualifying homeowners free of cost. The homeowner must commit to the maintenance of the trees.

Table 8: Turf to Trees Summary

Year	Number of Participants	Number of Trees Planted
FY2017	16	2,062
FY2018	14	1,264
FY2019	28	2,195
FY2020 *	14	940
FY2021 **	24	1,808
FY2022	29	3,367
Total	125	11,636

*FY2020- Limited spring plantings due to COVID-19

**No Spring 2021 plantings due to cicadas

Residential Car Care and Washing

Public Education

Residential car care and car washing topics are included in presentations to the public and outreach activities at schools. The County has spoken to the Howard County Public Schools regarding the car wash fundraisers that were being done by many schools. An explanation of the IDDE program and what can and cannot enter the storm drain system was provided. In general, school car wash fundraisers have stopped.

Proper Pet Waste Management

The Bark Ranger Program

In the summer of 2013, the Park Rangers of Howard County Recreation and Parks implemented a new educational initiative. “Bark Ranger” encourages patrons to clean up after their pets, specifically dogs, and to use a leash while visiting a Howard County parks. Dog feces left on the ground is unsightly, negatively impacts our ground and surface water, and attracts rodents. It is important to keep your dog on a leash. Not only is it the law, but it is important to protect wildlife, and be considerate to the other park patrons. We encourage the public and their pooches to take the pledge and be committed to protecting our environment. Currently the program has over 3,529 participants signed up that have taken the Bark Ranger pledge:

*My Human and I care about our environment and the safety of others around us.
We pledge to do our "doodie" and clean up after ourselves.
I will remain on my leash by my Human's side at all times.*

As part of the Bark Ranger pledge, participants receive a Bark Ranger cloth bandana and a plastic bone which contains baggies to remove pet excrement. Through this initiative, visitors of Howard County Recreation and Parks facilities are made aware of the negative environmental impact that pet feces have. Through this interpretation, those who participate, are appreciated for the “dirty jobs” of pet-ownership and rewarded with a small token.

Information Provided to the Community

The County provides various stormwater quality information to the community related to:

- NPDES Permitting Requirements
- Pollution Prevention Plan Development
- Proper Housekeeping
- Spill Prevention and Response

This information is provided when requested through presentations, mailings, telephone conversations, and one-on-one discussions in person.

Other Public Outreach and Education:

Watershed Enhancement Grant

Since 2009 Howard County has promoted water quality enhancements throughout the County through its Watershed Enhancement Grant (WEG) program. Every year since the program's inception non-profit agencies are encouraged to submit WEG proposals for in the ground projects and/or for public outreach and education efforts that will promote water quality improvements throughout the County. In 2017, the County began a partnership that continues today with the Chesapeake Bay Trust to have them advertise and administer this grant program. In the Annual Report 27 reporting period, the County set aside and awarded \$160,000 in grants to non-profits for a variety of projects.

Water Reporter

The HCPSS Watershed Report Card program for 9th grade students successfully utilized Water Reporter in the fall of 2020 to track their water quality monitoring data and share through the interactive map feature. We continue to encourage residents to use Water Reporter to share stream conditions and post Stream Mapper reports.

Storm Drain Stenciling

The Office of Community Sustainability developed a storm drain stencil with a local message, "Only Rain Down the Drain: Drains to Patuxent River/Patapsco River" to remind residents that materials dumped in storm drains will result in degradation of local water bodies. To date, over 550 drains have been stenciled by local groups including: homeowners associations, Eagle Scouts, Boy Scouts, Girl Scouts, Howard Community College, Howard County Public Schools, Howard County Watershed Stewards Academy, Baltimore Aircoil Company, and the READY program. The message itself will remind passersby not to pollute, but also educate the volunteers stenciling the drains and the communities witnessing the projects.

Community Groups

The Office of Community Sustainability participates in several groups which educate the public about stormwater management, most prominently: Howard EcoWorks, the Howard County Watershed Stewards Academy (WSA), the Watershed Improvement Network (WIN), the Howard County Earth Forum, the Watershed Report Card Program, the Maryland Water Monitoring Council (MWMC), the Sierra Club, Greater Baltimore Wilderness Coalition, and Transition Howard County.

Health Department

The Howard County Health Department continues to maintain information on its webpage noting that old prescriptions and medicines should not be poured down the drain or flushed since it may negatively affect the quality of streams, waterways, and the Bay. As part of the on-going Bay Restoration Fund (BRF) grant program, the Health Department continues to identify, prioritize and inspect qualifying properties with failing septic systems, coordinating the connecting of qualifying homes currently on septic systems within the Metropolitan District, plus evaluating system upgrades for possible acceptance into the grant program. State legislation effective November 2016 enables non-critical area counties (including Howard) the ability to exercise flexibility in requiring Best Available Technology (BAT) units for all new construction. This flexibility has helped enable a better targeted application of BRF funding, while leaving in place public health priorities. This has resulted in a reduction of BAT unit installations in the county since that time. The FY 2022 grant award for Howard County was \$234,000 including main allocation and mid-year supplement. Proposals to MDE will be prioritized upon readiness to proceed, benefit to the public and groundwater. MDE, through HB12 legislation, has established criteria for additional funding to cover administrative costs of the BRF program for each county based upon county agreed to levels of support. Howard County has secured funding through FY 2023 for the lower-level support (up to \$57,000 each year based upon MDE certification). Howard County received \$55,000 in this additional BRF money in

FY2022. During the fiscal year, the Health Department sent letters to homeowners who were overdue for BAT service.

E. Restoration Plans and Total Maximum Daily Loads

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Attachment B).

Howard County shall annually provide watershed assessments, restoration plans, opportunities for public participation, and TMDL compliance status to MDE. A systematic assessment shall be conducted and a detailed restoration plan developed for all watersheds within Howard County. As required below, watershed assessments and restoration plans shall include a thorough water quality analysis, identification of water quality improvement opportunities, and a schedule for BMP and programmatic implementation to meet stormwater WLAs included in EPA approved TMDLs.

1. Watershed Assessments

- a. By the end of the permit term, Howard County shall complete detailed watershed assessments for the entire County. Watershed assessments conducted during previous permit cycles may be used to comply with this requirement, provided the assessments include all of the items listed in PART IV.E.1.b. below. Assessments shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County water quality analysis.*
- b. Watershed assessments by the County shall:*
 - I. Determine current water quality conditions;*
 - II. Include the results of a visual watershed inspection;*
 - III. Identify and rank water quality problems;*
 - IV. Prioritize all structural and nonstructural water quality improvement projects; and*
 - V. Specify pollutant load reduction benchmarks and deadlines that demonstrate progress toward meeting all applicable stormwater WLAs.*

Annual Update Number 27 Status

Under Howard County's current MS4 permit (Part IV.E.1), the County is required to develop Watershed Assessments to assess current conditions and to identify restoration opportunities to address pollutant reductions in approved TMDLs. In accordance with this requirement, Howard County's SWMD sponsored assessments of the Little Patuxent and Middle Patuxent Watersheds in 2015 which were reported on in AR20. In 2016 the County completed assessments in the Patuxent watersheds (Brighton Dam, Patuxent River Upper, and Rocky Gorge Dam) and the Patapsco watersheds (Patapsco River Lower North Branch, Patapsco River South Branch) thereby completing assessments of all the County's watersheds. The County scheduled public meetings in late January of 2017 to introduce the assessment results and provide the assessments for a 30-day comment period. No comments were received. The County continues to perform restoration projects from the Watershed Assessments as projects that will provide water quality improvement and impervious area surface restoration.

2. Restoration Plans

- a. *Within one year of permit issuance, Howard County shall submit an impervious surface area assessment consistent with the methods described in the MDE document “Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits” (MDE, Jun. 2011 or subsequent versions). Upon approval by MDE, this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit.*

By the end of this permit term, Howard County shall commence and complete the implementation of restoration efforts for twenty percent of the County’s impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a. that has not already been restored to the MEP. Equivalent acres restored of impervious surfaces, through new retrofits or the retrofit of pre-2002 structural BMPs, shall be based upon the treatment of the WQ_v criteria and associated list of practices defined in the 2000 Maryland Stormwater Design Manual. For alternate BMPs, the basis for calculation of equivalent impervious acres restored is based upon the pollutant loads from forested cover.

- b. *Within one year of permit issuance, Howard County shall submit to MDE for approval a restoration plan for each stormwater WLA approved by EPA prior to the effective date of the permit. The County shall submit restoration plans for subsequent TMDL WLAs within one year of EPA approval. Upon approval by MDE, these restoration plans will be enforceable under this permit. As part of the restoration plans, Howard County shall:*
 - I. *Include the final date for meeting applicable WLAs and a detailed schedule for implementing all structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives necessary for meeting applicable WLAs;*
 - II. *Provide detailed cost estimates for individual projects, programs, controls, and plan implementation;*
 - III. *Evaluate and track the implementation of restoration plans through monitoring or modeling to document the progress toward meeting established benchmarks, deadlines, and stormwater WLAs; and*
 - IV. *Develop an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs where EPA approved TMDL stormwater WLAs are not being met according to the benchmarks and deadlines established as part of the County’s watershed assessments.*

Annual Update Number 27 Status

To meet the requirements under section IV.E Restoration Plans and Total Maximum Daily Loads, Howard County developed several related projects in 2015-2016. First are the watershed assessments conducted in the Little Patuxent and Middle Patuxent watersheds (2015) and the assessments for the Patuxent and Patapsco watersheds (2016) which were described in previous annual reports. The Countywide Implementation Strategy, or CIS, was developed in 2015 as the County’s overall Restoration Plan. The County updated the CIS in December of 2017

based on MDE comments, the County's approved impervious baseline, updates to the County's programs and strategies, and County progress made through FY17.

The CIS included three major elements:

1. Impervious Area Assessment – to set the County's total jurisdictional impervious area, the total treated impervious area, the baseline untreated impervious area, and the 20% restoration target.
2. Impervious Area Restoration – the CIS establishes the current progress and the planned project and programs needed to meet the impervious restoration by the end of the permit in December 2019.
3. TMDL Restoration – the CIS establishes the current progress and the planned project and programs needed to meet the County's stormwater wasteload allocation (SW-WLAs) with cost, schedule, and final dates for meeting each required reduction.

The CIS is not updated and resubmitted with this FY22 annual report. The County is using other planning and reporting mechanisms to continue its planning and tracking efforts including the impervious restoration accounting analysis and reporting (*Howard County Impervious Restoration Accounting: Methodology and Results*), annual MS4 reports that include updates on implementation and modeled pollutant load reductions, and individual TMDL plans for new TMDLs finalized after the CIS update in 2017.

Impervious Area Assessment

As a requirement of section PART IV.E.2.a of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit issued by MDE to Howard County, the County must conduct an impervious area assessment. The assessment defines the County's impervious area baseline and sets the 20% impervious area restoration goal for pre-2002 impervious acres not already restored to the maximum extent practicable (MEP). The restoration was required to be complete by December 2019, the end of the administratively continued permit term. As part of the impervious area accounting and restoration process, the MS4 Permit provides for each Phase I MS4 municipality to submit an updated and revised impervious baseline in year 4 of the current permit, which for Howard County was 2018. The revised baseline can include changes related to newly documented BMPs, updates to restoration BMP crediting, and improvements in the supporting GIS data and databases.

Previous Assessments

Howard County submitted the revised impervious baseline report (*Howard County Impervious Area Classification and Baseline Accounting: Methods and Results*) in December of 2018 with the NPDES annual report. Per comments from MDE dated August 2, 2019, MDE accepted Howard County's methodology but asked for clarification of the classification of impervious acres deducted from Howard County's baseline. In response to MDE's comments, the *Impervious Area Classification and Baseline Accounting* report was revised and resubmitted with AR24 in November of 2019. The revisions attempted to address MDE's comments, clarify the impervious area assessment, and finalize the County's baseline. The document followed the Impervious Surface Area Assessment steps laid out in Section II, steps 1 through 5 of MDE's 2014 Accounting Guidance (MDE, 2014) to determine the stormwater conveyance or system of conveyances owned and operated by Howard County and, ultimately, the impervious area that has not already been treated or restored to the MEP, or baseline, and is subject to the 20% restoration requirement. To define the delineated MS4, Howard County included the Census Urbanized Area, County-owned property and roadway right of way, and those areas that drain to and through the County's currently mapped stormwater infrastructure including outfalls, storm drains, and stormwater BMPs. Per the 2014 MDE guidance,

the County would have continuous updates to the extent of the delineated MS4 as new development and field verification are implemented throughout the County to maintain an accurate delineated area.

MDE's comments on the November 2019 version were received by the County in April of 2020. A major comment addressed the County's use of a delineated MS4 area to define the impervious areas that the County is responsible for in terms of the 20% restoration goal and stated that the area in question needed to be jurisdiction-wide.

Current and Final Assessment

Following receipt of MDE's comments on the November 2019 baseline accounting and based on additional discussions between Howard County and MDE, Howard County chose to forgo the use of a delineated MS4 boundary and is using the jurisdiction-wide MS4, per MDE direction, for the purposes of setting the baseline, 20% impervious area restoration target, and performing the final impervious area restoration accounting for the permit term ending in 2019. However, the County reserves the right to revisit the issue in the future should it become necessary.

The County submitted a FINAL baseline accounting methodology and results report to MDE in June of 2020, along with supplemental files and backup. The County also submitted a final version of the *Howard County Impervious Restoration Accounting: Methodology and Results* report, which addresses MDE comments on previous versions of the report and documents the County's impervious restoration through the end of the permit term. Both reports are included as narrative files included with this AR25 submittal.

Based on the MDE accepted methods, the total MS4 impervious surface area under the County's responsibility is 15,223.4 acres as of 2002, the baseline year. The impervious baseline treated area is 4,204.5 acres, and the untreated area or area not treated to the MEP is 11,018.9 acres. Applying the 20% factor to the untreated area yields a 20% restoration target of 2,203.8 acres. These values match those reported and approved by MDE in the June 2020 baseline accounting report. A summary of the assessment per watershed is presented in Table 9. It is noted that the rooftop and non-rooftop disconnects were not analyzed per watershed, therefore the untreated and treated for each subwatershed reported below do not account for the disconnects but the total analysis at the County scale is correct.

Table 9: Impervious Area Assessment Summary in Acres

Watershed	Countywide MS4 Impervious Area	Impervious Baseline Treated	Calculated Impervious Baseline Untreated	Restoration Target (20%)
Triadelphia Reservoir (Brighton Dam)	1,377.6	95.6	1,282.0	
Little Patuxent River	7,080.1	1,558.9	5,521.2	
Middle Patuxent River	2,506.9	452.1	2,054.8	
Patapsco River L N Br	2,971.4	834.2	2,137.2	
Patuxent River Upper	311.0	108.8	202.2	
Rocky Gorge Dam	424.1	66.2	357.9	
South Branch Patapsco	552.2	13.9	538.3	
Rooftop and Non-Rooftop Disconnects	N/A	1,074.8	N/A	
Countywide	15,223.4	4,204.5	11,018.9	2,203.8

Impervious Area Restoration Progress Through December 2019

A summary of the impervious restoration progress made through the end of the County's permit term (December 17, 2019) by Howard County is included in Table 10 below and detailed in the report submitted with this annual report titled *Howard County Impervious Restoration Accounting: Methodology and Results, Revised June 2020*. Projects and programs completed after June 20, 2010, and up through the end of FY19 (June 30, 2019) and through the end of the permit term in December 2019 are restoration and are applied to meeting the 20% target. Impervious restoration calculations were made following MDE's 2014 Accounting Guidance and associated Bay Program Expert Panel reports.

Through the end of the current permit, the County has achieved credits for restoring 2,912.6 acres or 26.4% of the untreated impervious baseline. Based on these results Howard County has met its responsibility to restore 20% of its baseline within the permit term. Details of the specific projects implemented, and their associated impervious reductions and cost can be found in the County's NPDES geodatabase submitted with this annual report.

Table 10: Impervious Area Restoration End of Permit Term Progress Summary in Acres

Watershed	Restoration Progress through End of Permit Term as of December 2019	Restoration Progress through End of Permit Term to 20% Target
Permanent Credits		
Triadelphia Reservoir (Brighton Dam)	192.7	42.9
Little Patuxent River	1,364.8	1,005.1
Middle Patuxent River	253.6	143.9
Patapsco River L N Br	525.3	443.6
Patuxent River Upper	0.1	0.1
Rocky Gorge Dam	9.8	7.2
South Branch Patapsco	6.9	6.5
Subtotal Permanent Credits	2,353.1	1,649.2
Annual Practice Credits		
Inlet and Pipe Cleaning (average FY17 to end of permit term)	67.8	67.8
Street Sweeping (average FY11 to FY19)	351.4	351.4
Septic Pump-outs (5-yr period)	140.3	140.3
Subtotal Annual Credits	559.5	559.5
Summary		
Total Countywide Impervious Restoration	2,912.6	2,208.8
% Impervious Treated	26.4%	20.0%
Remaining Impervious Restoration Acres in Current (Administratively Continued) Permit Term	0	0

Impervious Area Restoration Planned Progress

The County has purposely programmed more projects than necessary to reach the 20% impervious surface restoration goal of its current permit as an adaptive management measure, in the event that certain projects would have been delayed or deemed not feasible. In addition, changes in crediting rates and methods throughout the permit term led to adjustments in restoration progress calculations each year. As such, Howard County

exceeded its 20% impervious surface restoration goal by 708.8 acres or 6.4%, based on the impervious restoration calculations made following MDE's 2014 Accounting Guidance and associated Bay Program Expert Panel reports.

The County ran an analysis to determine when the 20% goal was reached. To do this, first the annual practice treatments were accounted for, including street sweeping, inlet cleaning, and septic system pump-outs. Then each permanent credit project was ordered sequentially by date of completion. In this analysis it is determined that the 20% goal was reached on March 30, 2018. The last project in the credit sequence overtreated the 20% goal by 5.0 impervious acres making the County's total impervious restoration 2,208.8 impervious acres. Table 10 presents the County's final current permit values, showing restoration progress for permanent practices and annual practices up to the 20% goal. The impervious restoration is also presented in the RESTORED_ACRES field of the Impervious Surfaces table in the County's NPDES geodatabase. Projects that were completed after the 20% goal was met and those new projects added to the analysis completed in FY21 and FY22 are included in the geodatabase submitted with this annual report. It is Howard County's intention and MDE has acknowledged that any and all projects completed after the County has met its 20% impervious surface restoration goal and prior to issuance of its next MS4 permit will be credited toward the County's impervious surface restoration goals outlined in the next MS4 permit. Additionally, it is the County's understanding that impervious area restoration calculations for projects completed after the 20% is met will be based on MDE's new 2021 Accounting Guidance, therefore all projects and programs credited to the upcoming permit are calculated following MDE's final 2021 Accounting Guidance, published on November 5, 2021. All permanently credited projects after March 30, 2018, are credited toward the County's next MS4 permit and can be identified by referring to the PERMIT_NUM field of the County's NPDES geodatabase and sorting for "22-DP-3318." In addition, as a result of routine database cleanup efforts, there are some projects that were completed before March 30, 2018, that were newly identified and have now been added to the County's datasets. These records are also identified under the Permit Number "22-DP-3318." The County thought it was a cleaner approach to include these projects in crediting toward the next permit rather than changing the final treatment values under the current permit which has been previously submitted and reviewed and approved by MDE. The County has discussed this situation with MDE, and MDE approved of the accounting approach.

TMDL Restoration Plan

Local TMDLs

As a requirement of section PART IV.E.2.b of the County's NPDES MS4 permit, the County developed a restoration plan by December 2015 for each SW-WLA approved by EPA prior to the effective date of the permit. As noted previously, the County developed the Countywide Implementation Strategy (CIS) in 2015 (submitted with AR20) to address this requirement. A revised CIS was included with the County's AR22 submittal in 2017. It is the County's understanding based on draft and tentative determination versions of the next permit, that a *Countywide Stormwater TMDL Implementation Plan* will be required and will be updated annually. The County will complete this plan in the new permit cycle as the next major update to the CIS.

There are currently 10 final approved TMDLs within Howard County with either an individual or aggregate SW-WLA, nine of which were addressed in the CIS. Since completion of the CIS, only one new local TMDL has been adopted, a PCB TMDL for the Patuxent approved by the EPA in September of 2017. Howard County submitted a draft PCB TMDL Restoration Plan for the Tidal Fresh portion of the Patuxent River (PAXTF) to MDE in September 2018. MDE approved the County's plan in a comment letter dated September 23, 2019. Howard County received comments from MDE, held two meetings with MDE to discuss the plan including the source tracking and monitoring elements, and collaborated with Anne Arundel County on a consistent monitoring approach. Howard County addressed the comments and submitted a revised version of the report in April of 2020. Howard County is continuing dialogue with MDE and Anne Arundel County before developing a

Sampling and Analysis Plan and initiating field investigations. Howard County and Anne Arundel County also met with KCI and other jurisdictions listed in the PCB TMDL, including Montgomery County, Prince George's County, and Maryland Department of Transportation State Highway Administration, on August 19, 2021, and October 21, 2021, to discuss further collaboration and consistency in approach when developing a Patuxent Sampling and Analysis Plan and initiating field investigations. The jurisdictions will continue to meet and collaborate. MDE published their PCB guidance document, *Guidance for Developing Local PCB Total Maximum Daily Load (TMDL) Stormwater Wasteload Allocations (SW-WLA) Watershed Implementation Plans (WIPs)*, in August 2022. Because the focus for PCBs is currently on source tracking, MDE has recommended in the guidance that modeling PCB loads and reductions is not helpful or necessary at this stage. Therefore, the County has not re-modeled PCB loads for the FY20-FY22 progress runs and has not included modeling results and loads (baseline, target, permit, current) in the submitted geodatabase. MDE published their bacteria guidance document, *Guidance for Developing Bacteria TMDL (Total Maximum Daily Load) Stormwater Wasteload Allocation (SW-WLA) Watershed Implementation Plans (WIPs)*, in February 2022. Similar to PCB TMDLs, the focus for bacteria is on source tracking and bacteria baseline and progress modeling is not required. The County has not re-modeled bacteria loads for the FY20-FY22 progress runs and has not included modeling results and loads in the submitted geodatabase.

Table 11 indicates the local TMDLs that the County is currently addressing. Although there are sediment and phosphorus TMDLs established for Centennial Lake (approved April 2002) and a bacteria TMDL established for the lower segment of the Patuxent River Upper (approved August 2011), they do not have SW-WLAs assigned to the Howard County MS4 source sector and are therefore not included in the County's TMDL requirements. The Triadelphia Reservoir has a sediment TMDL; however, the County MS4 Phase I urban sector requires a 0% reduction in baseline sediment loads and will not be addressed further. South Branch Patapsco does not have a local TMDL, but it is included in the analysis since it, with the Patapsco River Lower North Branch, makes up the Baltimore Harbor watershed. The Middle Patuxent watershed does not have a local TMDL. Attachment B of the County's current permit also lists a mercury impairment in Cash Lake in the Patuxent River Upper Watershed on the list of Howard County TMDLs with applicable SW-WLAs. Cash Lake and its drainage area are located wholly within Prince George's County; therefore, Howard County is not responsible for this TMDL, and it is not included.

Based on MDE guidance, growth in the stormwater load since the TMDL baseline year is not accounted for in the analysis. Local TMDLs are considered met, from a pollutant load accounting planning perspective, when the load reductions associated with restoration progress coupled with the planned restoration load reductions included in the County's database exceed the load reduction required. Some TMDLs are estimated to be exceeded by a wide margin because removals per pollutant type are not achieved at the same rate. TN removal rates are relatively low compared to TP and TSS on a per project basis. This impacts watersheds with multiple TMDLs and also nested watersheds as in Baltimore Harbor.

In 2021, MDE released their TMDL Implementation Progress and Planning (TIPP) tool which is a local TMDL modeling spreadsheet based on Chesapeake Bay Watershed Model Phase 6 (CBP WM P6). This spreadsheet model was used for the first time for 2021 reporting and was used again this year to model baseline, permit, and FY22 progress scenarios for all the local TN, TP, and TSS TMDLs. In addition, the local TMDL baseline scenarios developed in 2021 used impervious and turf acres that were translated to baseline conditions following a backcasting land cover methodology developed by Baltimore County and reviewed and approved by MDE. This backcasting methodology was refined in 2022 and used MDE's reclassified version of the Chesapeake Conservancy Land Use (CCLU) 2013/2014 data. Using the TIPP spreadsheet, the loads are translated from the values derived by the Bay model version that was used in the development of the TMDLs and translated to the TIPP model, making them compatible with current methods following MDE

recommendations. All County completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives through 7/18/2014 were modeled in the TIPP to calculate 2014 permit loads. Progress through the end of FY22 was modeled in the TIPP to calculate current progress loads for each TN, TP, and TSS local TMDL.

Table 11 presents translated baseline loads for each SW-WLA to calculate the load reduction required from the baseline value. Baseline loads for nutrient and sediment TMDLs have changed from what was reported in 2021 due to the revisions made to the backcasting methodology in 2022.

Table 11: Howard County Local TMDL Summary

Watershed Name	Watershed Number	WLA Type	Pollutant and Units	Baseline Year	Baseline Load	MDE Published Reduction
Patapsco River Lower North Branch	02130906	Individual	Sediment EOS lbs/yr	2005	34,014,781	10.0%
		Aggregate	Bacteria MPN/100m L/yr	2005	21,826	75.0%
Baltimore Harbor (Patapsco R LN Br + S Br Patapsco)	02130906	Aggregate	Nitrogen EOR lbs/yr	1995	125,672	15.0%
	02130908					
	02130906	Aggregate	Phosphorus EOR lbs/yr	1995	9,017	15.0%
	02130908					
Patuxent River Tidal Fresh	Subshed PAXTF	Aggregate	PCB g/yr	2014	208	99.9%
Patuxent River Upper	02131104	Individual	Sediment EOS lbs/yr	2005	1,769,959	11.4%
Little Patuxent River	02131105	Individual	Sediment EOS lbs/yr	2005	61,546,675	48.1%
Rocky Gorge Reservoir	02131107	Aggregate	Phosphorus EOR lbs/yr	2000	1,355	15.0%
Triadelphia Reservoir (Brighton Dam)	02131108	Aggregate	Phosphorus EOR lbs/yr	2000	5,640	15.0%
		Aggregate	Sediment EOR lbs/yr	2000	NA	0.0%

Chesapeake Bay TMDL

The Chesapeake Bay TMDL, established by the EPA (EPA, 2010), sets pollution limits for nitrogen, phosphorus, and sediment in the Chesapeake Bay Watershed. While not a requirement in the County's NPDES MS4 permit, strategies provided in County plans to meet local TMDL reduction targets and impervious restoration treatment are also modeled against the Bay TMDL goals in order to calculate progress. The County's MS4 permit is requiring compliance with the Chesapeake Bay TMDL for the stormwater sector through the use of the 20% impervious surface restoration strategy. CAST CBP WM Phase 6 was used to calculate baseline, target, permit and current loads for the Bay TMDL. Because CAST was developed specifically for Bay scale modeling for the Bay TMDL pollutants, it was determined to be the more appropriate modeling tool.

Management Measures

Management measures to reduce pollutant loads and restore impervious surfaces include structural stormwater BMPs, alternative practices, and non-structural County based and homeowner-implemented programs. These include projects currently identified in the County's Capital Improvement Plan (CIP) list. Details of the specific planned projects and their associated pollutant reductions can be found in the County's NPDES geodatabase.

Load Reductions

Load reductions achieved from restoration projects implemented from each individual TMDL baseline year through FY22 in the County's NPDES geodatabase are presented in Table 12.

Table 12: SW-WLA FY22 Progress Reductions Summary

	Baltimore Harbor		Little Patuxent	Patapsco R LN Branch		Patuxent River	Patuxent R Upper	Rocky Gorge Reservoir	Brighton Dam
	TN-EOR lbs/yr	TP-EOR lbs/yr	TSS-EOS lbs/yr	TSS-EOS lbs/yr	Bacteria ¹ MPN/100mL/yr	PCB ² g/yr	TSS-EOS lbs/yr	TP-EOR lbs/yr	TP-EOR lbs/yr
Reduction Targets									
TMDL Baseline Year	1995	1995	2005	2005	2003	2014	2005	2000	2000
Baseline Load	125,672	9,017	61,546,675	34,014,781	NA	NA	1,769,959	1,355	5,640
Target % Reduction	15.0%	15.0%	48.1%	10.0%	75.0%	99.9%	11.4%	15.0%	15.0%
Calibrated Target Reduction	18,851	1,353	29,603,951	3,401,478	NA	NA	201,775	203	846
Calibrated TMDL WLA	106,822	7,664	31,942,724	30,613,303	NA	NA	1,568,184	1,152	4,794
Current Reductions – 2022 Progress									
Restoration Reductions (from baseline to present)	9,864	2,249	13,206,778	9,601,859	NA	NA	47,457	718	528
Restoration Reduction %	7.8%	24.9%	21.5%	28.2%	NA	NA	2.7%	53.0%	9.4%
Reduction Remaining	8,986	-897	16,397,173	-6,200,381	NA	NA	154,318	-515	318
Reduction Percent Remaining	7.2%	-9.9%	26.6%	-18.2%	NA	NA	8.7%	-38.0%	5.6%

¹ Per MDE, bacteria modeling is not required, therefore loads are not reported.

² Per MDE, PCB modeling is not required, therefore loads are not reported.

Cost and Schedule

Details of the specific planned projects and their associated load reductions and cost can be found in the County's NPDES geodatabase submitted with this annual report. The County's local TMDL implementation schedule with end dates is included in Table 13. These are the timelines that were established in the 2015 and 2017 versions of the CIS, which will be reevaluated as modeling tools are updated and with the County's new permit.

Per MDE's bacteria guidance, TMDL Implementation Plans following the guidance methods and focused on source tracking and monitoring, are to be submitted within the first year of the County's upcoming new permit. Assuming a new permit is issued in December 2022, the County will develop a plan for the Patapsco bacteria TMDL in 2023 and following approval will proceed with implementation, monitoring, and the reporting elements outlined in the guidance.

The County plans to continue coordination with MDE, neighboring Counties, and MSHA with PCB TMDL responsibilities in the Patuxent River watershed. To comply with the timeline requirements of MDE's PCB TMDL guidance, the County will update its current PCB implementation plan in 2023, as needed, per the methods and requirements in the guidance and once reviewed and approved will proceed with developing the Sampling and Analysis Plan and Quality Assurance Project Plan in 2024 with a submittal prior to August 2024. Phase I sampling, which includes PCB screening at the outlets of each subwatersheds would commence following MDE's approval of the plan and monitoring strategy and will be complete and reported on within the permit term.

Table 13: Implementation Schedule with End Dates Indicated

Watershed	Fiscal Year												
	18	19	20	21	22	23	24	25	26	27	28	29	30
Little Patuxent									2025				
Middle Patuxent				No local TMDL									
Patuxent River TF			To be determined after Part I implementation										
Patuxent River Upper			2019										
Rocky Gorge Reservoir			2019										
Triadelphia Reservoir				2020									
Baltimore Harbor													2029
South Branch Patapsco													
Patapsco LNB													2029

¹ Primary project completion period is shown in green, additional implementation contingent period for each TMDL is in blue.

² Baltimore Harbor TMDL includes the South Branch Patapsco and Patapsco Lower North Branch watersheds. There is no local TMDL specifically for the South Branch Patapsco.

Adaptive Management

The MS4 permit calls for an iterative and adaptive plan for implementation. The County will continue to monitor implementation progress on a regular basis and will report progress, load reductions achieved, and impervious surface reductions to MDE with the NPDES Annual Update and at required milestone intervals. If new methods of

stormwater treatment are identified, or better approaches to source control are found, the plans can be extended and updated to take these changes into account. Similarly, if some elements of the plans are not as successful as expected, adaptations and improvements will be incorporated in future updates. Plans may also change if pollutant removal crediting methods are modified in the future.

Modeling methodologies have not changed in 2022 since the baseline, permit, and progress loads were also calculated using MDE's TIPP spreadsheet tool in 2021. However, because of the revisions made to the backcasting land cover methodology, there are changes in baseline loads observed for all nutrient and sediment TMDLs when compared to 2021 results. Baseline loads increased for the County's sediment local TMDLs and decreased for the County's nutrient local TMDLs when compared to 2021 results. Changes to the baseline load affect the target reduction and target WLA. MDE is aware that the County switched from using the original CCLU 2013/2014 data to MDE's reclassified version and that revising the backcasting land cover methodology will affect the results of the County's nutrient and sediment local TMDLs. The County will revisit modeling and land cover methodologies again in FY23 to ensure the most up to date methodologies are being used for reporting.

Additionally, it is the County's understanding that once the County is under its next generation permit, that in addition to the MDE spreadsheet model for local TMDLs, that impervious acre equivalencies will be calculated based on MDE's updated *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* guidance (MDE, 2021) and associated Bay Program expert panel reports.

3. Public Participation

Howard County shall provide continual outreach to the public regarding the development of its watershed assessments and restoration plans. Additionally, the County shall allow for public participation in the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving TMDLs and water quality standards. Howard County shall provide:

- a. Notice in a local newspaper and the County's website outlining how the public may obtain information on the development of watershed assessments and stormwater watershed restoration plans and opportunities for comment;***
- b. Procedures for providing copies of watershed assessments and stormwater watershed restoration plans to interested parties upon request;***
- c. A minimum 30 day comment period before finalizing watershed assessments and stormwater watershed restoration plans; and***
- d. A summary in each annual report of how the County addressed or will address any material comment received from the public.***

Annual Update Number 27 Status

Little Patuxent and Middle Patuxent Watershed Assessments

For the Little Patuxent and Middle Patuxent Watershed Assessments the County provided public notice in the Howard County Times legal section on June 4, 2015, and November 19, 2015, as well as on the County public meeting webpage and the SWMD webpage. A general press release noting the meetings was also available to local media outlets. The press release and legal ad noted when the watershed assessment and restoration plans would be available to begin the 30-day review period. Public meetings were held on the following:

*Table 14: Little Patuxent River and Middle Patuxent River Watershed
Assessment Public Meeting Schedule*

Date	Watershed	Time	Location
6/17/2015	Southern Middle Patuxent	7:00 pm – 8:30 pm	Robinson Nature Center
6/22/2015	Northern Little Patuxent	7:00 pm – 8:30 pm	Dunloggin Middle School
6/24/2015	Southern Little Patuxent	7:00 pm – 8:30 pm	Hammond High School
6/30/2015	Northern Middle Patuxent	7:30 pm – 9:00 pm	Folly Quarter Middle School
Date	Watershed	Time	Location
12/2/2015	Northern Middle Patuxent	6:30 pm – 8:00 pm	Gary J. Arthur Community Center
12/3/2015	Southern Little Patuxent	6:30 pm – 8:00 pm	North Laurel Community Center
12/9/2015	Southern Middle Patuxent	6:30 pm – 8:00 pm	Robinson Nature Center
12/10/2015	Northern Little Patuxent	6:30 pm – 8:00 pm	Howard Community College

In addition to the public notice provided in the Howard County Times, postcards were mailed with meeting invitation encouraging the residents within the watershed(s) to attend the public meeting(s). All public meeting attendees were given the opportunity to comment on issues and goals of the watershed assessment.

The County investigated any issues raised and reviewed any comments received on the watershed assessments. During the public meetings only comments about specific problems on individual properties were received. All have been followed up on, either by meeting with the property owner and/or by adding the site to the watershed assessment.

After the public meetings, both the watershed assessments and the Countywide Implementation Strategy (CIS) reports were made available for public review and comment for a minimum 30 days. The County received comments on both documents from the Chesapeake Bay Foundation (CBF) and also received comments from a citizen regarding the CIS only. The comments and a summary of how the County addressed them were included in Annual Report 21.

Mainstem Patuxent and Patuxent River Watershed Assessments

Watershed assessments for the Mainstem Patuxent River and Patapsco River Watersheds were performed in 2016. The Mainstem Patuxent River is made up of the Brighton Dam/Triadelphia Reservoir Watershed, the Rocky Gorge Reservoir Watershed, and the Upper Patuxent River Watershed. The Mainstem Patapsco River Watershed is made up of the Lower North Branch and the South Branch Patapsco River Watersheds. For the Mainstem Patuxent River and Patapsco River Watershed Assessments the County provided public notice for round 1 of the public meetings in the Howard County Times legal section on June 9, 2016, and for round 2 on January 5, 2017, as well as on the County public meeting webpage and the SWMD webpage. A general press release noting the meetings was also available to local media outlets. The press release and legal ad noted when the watershed assessment and restoration plans would be available to begin the 30-day review period. Public meetings dates and times for the Mainstem Patuxent River and Patapsco River Watershed Assessments are following:

*Table 15: Mainstem Patuxent River and Patapsco River Watershed
Assessment Public Meeting Schedule*

Date	Watershed	Time	Location
6/21/2016	Rocky Gorge Reservoir and Upper Patuxent River	7:00 pm – 8:30 pm	North Laurel Community Center
6/23/2016	Lower North Branch Patapsco	7:30 pm – 9:00 pm	Roger Carter Community Center
6/28/2016	South Branch Patapsco and Brighton Dam/Triadelphia Reservoir	7:00 pm – 8:30 pm	Gary J. Arthur Community Center
Date	Watershed	Time	Location
1/23/2017	Mainstem Patuxent River	7:00 pm – 8:30 pm	Gary J. Arthur Community Center
1/26/2017	Mainstem Patapsco River	7:00 pm – 8:30 pm	Roger Carter Community Center

No public comments were received on the Mainstem Patuxent River and Patapsco River Watershed Assessments themselves. The County investigated any issues brought to our attention at the public meetings, which were limited to comments about specific problems on individual properties. All have been followed up on, either by meeting with the property owner or performing site reviews and relaying the issues to the proper County agencies.

4. TMDL Compliance

Howard County shall evaluate and document its progress toward meeting all applicable stormwater WLAs included in EPA approved TMDLs. An annual TMDL assessment report with tables shall be submitted to MDE. This assessment shall include complete descriptions of the analytical methodology used to evaluate the effectiveness of the County's restoration plans and how these plans are working toward achieving compliance with EPA approved TMDLs. Howard County shall further provide:

- a. Estimated net change in pollutant load reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives;***
- b. A comparison of the net change in pollutant load reductions detailed above with the established benchmarks, deadlines, and applicable stormwater WLAs;***
- c. Itemized costs for completed projects, programs, and initiatives to meet established pollutant reduction benchmarks and deadlines;***
- d. Cost estimates for completing all projects, programs, and alternatives necessary for meeting applicable stormwater WLAs; and***
- e. A description of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable stormwater WLAs are not being met or when projected funding is inadequate.***

Annual Update Number 27 Status

The reporting items requested under permit condition E.4.a-e are based on the 2022 progress evaluation presented in the County's NPDES geodatabase through the end of fiscal year 202 (June 30), and the planned management and restoration strategies. A detailed accounting of the stormwater BMPs, alternate practices, and programs implemented through 2022 is included in the County's NPDES geodatabase. Progress results are summarized here to address the permit condition.

Pollutant Load Reductions

Baseline, target, permit, and current loads for nutrient, and sediment local TMDLs are presented in the MDE NPDES MS4 geodatabase table LocalStormwaterWatershedAssessment. Per guidance from MDE, the County did not re-model bacteria and PCB loads for the FY22 progress and has therefore not included modeling results and loads in the submitted geodatabase table. Countywide baseline, target, permit, and current loads are presented in table CountywideStormwaterWatershedAssessment.

In 2021, MDE released their TMDL Implementation Progress and Planning (TIPP) tool which is a local TMDL modeling spreadsheet based on Chesapeake Bay Watershed Model Phase 6 (CBP WM P6). This spreadsheet model was used for the first time for 2021 reporting and was used again this year to model baseline, permit, and FY22 progress scenarios for all the local TN, TP, and TSS TMDLs. In addition, the local TMDL baseline scenarios developed in 2021 used impervious and turf acres that were translated to baseline conditions following a backcasting land cover methodology developed by Baltimore County and reviewed and approved by MDE. This backcasting methodology was refined in 2022 and used MDE's reclassified version of the CCLU 2013/2014 data. Table 16 presents load reduction values from FY22 modeling using the TIPP. MDE is aware that switching from the original CCLU 2013/2014 data to MDE's reclassified version will affect the progress results of the County's nutrient and sediment local TMDLs. The County will revisit modeling and land cover methodologies again in FY23.

Item E.4.a requests the net change in pollutant loads reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives. Additionally, item E.4.b requires a comparison to the County's SW-WLAs. Taken together these requests are focused on the progress made in addressing local TMDL SW-WLAs. Therefore, the County considers this request to include restoration projects and programs completed from the baseline SW-WLA year (which differs between watersheds) to the current year.

Table 16: SW-WLA Progress Reductions as of 2022

Watershed Name	Watershed Number	Pollutant	Scale ¹	Calibrated Target Reduction ²	Reduction Percent Required	2022 Progress Load Reduction ²	2022 Progress Reduction Percent
Patapsco River Lower North Branch	02130906	Sediment	EOS	3,401,478	10.0%	9,601,859	28.2%
		Bacteria ³	EOS	NA	NA	NA	NA
Baltimore Harbor	02130906	Nitrogen	EOR	18,851	15.0%	9,864	7.8%
	02130908						
	02130906	Phosphorus	EOR	1,353	15.0%	2,249	24.9%

(Patapsco R LN Br + S Br Patapsco)	02130908						
Patuxent River ³	PAXTF	PCB	EOS	NA	NA	NA	NA
Patuxent River Upper	02131104	Sediment	EOS	201,775	11.4%	47,457	2.7%
Little Patuxent River	02131105	Sediment	EOS	29,603,951	48.1%	13,206,778	21.5%
Rocky Gorge Reservoir	02131107	Phosphorus	EOR	203	15.0%	718	53.0%
Triadelphia Reservoir (Brighton Dam)	02131108	Phosphorus	EOR	846	15.0%	528	9.4%
		Sediment	EOR	--	0.0%	--	--

¹ EOS is Edge of Stream, EOR is Edge of River

² All values in lbs/yr except for bacteria which is bn MPN/yr and PCB which is g/yr.

³ Per MDE, bacteria and PCB modeling is not required, therefore loads are not reported.

See Table 16 above for detailed comparisons between the FY22 progress load reductions and reduction percent and the required reduction and reduction percent. Some TMDLs are projected to be far exceeded because removals per pollutant type are not achieved at the same rate. This generally occurs in watersheds with more than one pollutant type with a SW-WLA, and in nested watersheds. TN removal rates are relatively low compared to TP and TSS on a per project basis. For example, the number of projects needed to meet the Baltimore Harbor TN reduction goal resulted in overachieving on the TP reduction and the TSS reduction in the Patapsco River LNB, which is nested in the Baltimore Harbor watershed.

According to the current TIPP model results with BMP implementation through FY22, three local TMDLs have been met. They are listed here with the CIS planned target completion date:

- Baltimore Harbor – phosphorus – 2029
- Patapsco LNB – sediment – 2029
- Rocky Gorge Reservoir – phosphorus – 2019

Two local TMDLs, based on current TIPP modeling results, have not been met prior to or by the original dates set in the CIS in 2015 and 2017. Analysis in the CIS using earlier modeling methods based on Bay model version 5.3.2 (BayFast and MAST) indicated that pollutant load reductions would have been met by 2019 for the Patuxent River Upper sediment TMDL and for the Triadelphia Reservoir phosphorus TMDL. Changes in the modeling between Bay model 5.3.2 and Phase 6, which is the basis for the TIPP model have changed the baseline loads and reductions resulting in the SW-WLAs not being met.

The County will revisit implementation modeling and reassess TMDL target years in the new permit cycle as part of the next major update to the CIS within the Countywide Stormwater TMDL Implementation Plan.

Cost of Completed Projects

The County's FY22 capital budget for restoration projects (pond retrofits, stream restoration) including design and construction was \$104 million. The projected FY23 capital project budget for restoration projects is \$53 million.

Annual costs for street sweeping are \$400,000 and for inlet cleaning are \$100,000. Costs of individual projects are detailed in the submittal NPDES geodatabase.

Cost of Planned Projects and Programs

The County has allocated approximately \$53 million in capital budget for FY23. A portion of those dollars are marked for design and construction of restoration projects for TMDLs. In addition, the County has budgeted for \$6.9 million in operating budget to support general NPDES compliance.

The County anticipates receiving a new NPDES MS4 permit at the end of this year or early next year (CY23), which could place different or new requirements on the County with regard to the Bay TMDL, impervious restoration, and targeted reductions for TN and TSS. Additionally, modeling methods and impervious restoration calculation methods have changed with development of MDE's modeling tools for local TMDLs and MDE's *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* guidance (MDE, 2021). Changes in loading and reduction rates have changed current local TMDL progress and anticipated load reductions from planned BMPs.

Based on these factors, all local TMDLs will be re-evaluated to assess progress in 2023, and as a consequence, detailed annual fiscal budgets for NPDES and TMDL compliance are not possible. The County plans to update the CIS in the new permit cycle to plan for the next several years of progress toward TMDL goals.

F. Assessment of Controls

Howard County and ten other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990s. From this expansive monitoring, a statewide database has been developed that includes hundreds of storms across numerous land uses. Analyses of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. To build on the existing information and to better track progress toward meeting TMDLs, better data are needed on ESD performance and BMP efficiencies and effectiveness.

Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. The County shall use chemical, biological, and physical monitoring to assess watershed restoration efforts, document BMP effectiveness, or calibrate water quality models for showing progress toward meeting any applicable WLAs developed under EPA approved TMDLs identified above. Additionally, the County shall conduct physical stream monitoring to assess the implementation of the latest version of the 2000 Maryland Stormwater Design Manual. Specific monitoring requirements are described below.

1. Watershed Restoration Assessment

The County shall continue monitoring in the Wilde Lake and Red Hill Branch watersheds, or select and submit for MDE's approval a new watershed restoration project for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities can be assessed. One outfall and an associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored. The minimum criteria for chemical, biological, and physical monitoring are as follows:

a. Chemical Monitoring

- i. *Eight (8) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather*

- periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;*
- ii. Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;*
 - iii. At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136 and event mean concentrations (EMC) shall be calculated for:*

<i>Biochemical Oxygen Demand (BOD₅)</i>	<i>Total Lead</i>
<i>Total Kjeldahl Nitrogen (TKN)</i>	<i>Total Copper</i>
<i>Nitrate plus Nitrite</i>	<i>Total Zinc</i>
<i>Total Suspended Solids</i>	<i>Total Phosphorus</i>
<i>Total Petroleum Hydrocarbons (TPH)</i>	<i>Hardness</i>
<i>E. coli or enterococcus</i>	

- iv. Continuous flow measurements shall be recorded at both in-stream monitoring stations or other practical locations based on an approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models. Pollutant load estimates shall be reported according to any EPA approved TMDLs with a stormwater WLAs.*
- b. Biological Monitoring*
- i. Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and instream monitoring locations or other practical locations based on an approved study design; and*
 - ii. The County shall use the EPA Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.*
- c. Physical Monitoring*
- i. A geomorphologic stream assessment shall be conducted in the Red Hill Branch watershed monitoring location or in a reasonable area based on an approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;*
 - ii. A stream habitat assessment shall be conducted using techniques defined by the EPA's RBP, MBSS, or other similar method approved by MDE; and*
 - iii. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.*
- d. Annual Data Submittal*
- The County shall describe in detail its monitoring activities for the previous year and include the following:*
- i. EMCs submitted on MDE's long-term monitoring database as specified in PART V below;*
 - ii. Chemical, biological, and physical monitoring results and a combined analysis for approved monitoring locations; and*
 - iii. Any requests and accompanying justifications for proposed modifications to the monitoring program.*

Annual Update Number 27 Status**Watershed Restoration Assessment****Wilde Lake Monitoring**

In 2006, the County began monitoring in the Wilde Lake watershed, and continued annually through the present reporting year. The Wilde Lake monitoring program includes geomorphic, chemical, physical habitat, and biological assessments conducted throughout the watershed to determine if the restoration efforts outlined in the *Centennial and Wilde Lake Watershed Restoration Plan* (CWP, 2005) are succeeding in reducing pollutant loading and increasing the health of the lakes and streams. The goal of the monitoring strategy is to assess the overall condition rather than focusing on specific sites. Additional detail on monitoring in Wilde Lake and results can be found in *Wilde Lake Watershed Discharge Characterization, Stream Monitoring and Watershed Assessment, Year Seventeen – 2022*.

Stormflow data were collected at Wilde Lake during this reporting period on September 1, and November 12, 2021; February 4, March 24, June 8, June 23, and June 26, 2022. Baseflow data were collected from four events during the reporting period; on August 31, and November 10, 2021; February 2, and June 2, 2022. The baseflow sampling event from August 31, 2021, is used to replace the missing eighth storm for the FY 2022 reporting period.

Median (2007-2022) concentrations of cadmium, copper, lead, and zinc in storm flows at the Wilde Lake sampling site continue to be consistently below their associated water quality criteria set by MDE. Average concentrations of cadmium and copper continue to be below the acute and chronic criteria while the average concentration of lead exceeds the chronic criteria, with two of seven storms having an EMC for lead greater than the chronic criteria and no storms greater than the acute criteria for lead. Both the acute and chronic criteria for zinc are the same (0.12 mg/L) and the average concentration exceeds these criteria. It should be noted that all exceedances for zinc occurred in 2014 or earlier and no concentrations greater than 0.12 mg/L were observed after 2014. TSS levels in stormflow samples continue to be elevated, but not greater than the published chronic criteria, as would be expected during storm events in urban streams. E. coli counts from stormwater were well above the published water quality criteria from 2015-2022, similar results to previously analyzed fecal coliform counts (2006-2015) which were also consistently high.

Biological monitoring was conducted in Spring 2022 at five sites in the Wilde Lake watershed. This was the 17th consecutive year of monitoring at Wilde Lake, which began in the spring of 2006. Sites sampled in 2022 were repeat visits of sites sampled in 2012 and again in 2017. Results of the Year 17 biological and physical habitat assessments in Wilde Lake indicated that the streams varied in habitat quality but were only marginally capable of supporting aquatic life. Benthic macroinvertebrate sampling results from 2022 were similar to the previous five-year coverage of sites in the Wilde Lake subwatershed with all sites showing a degraded urban stream condition; four of the five sites were in the lowest possible 'Very Poor' category and the remaining site was at 'Poor'. Three of the five sampling sites had RBP habitat that rated 'Partially Supporting' and two rated 'Not Supporting.' MBSS's Physical Habitat Index (PHI) rated one site as 'Partially Degraded,' and four sites as 'Degraded.' Overall, the stream system in the Wilde Lake watershed continues to exhibit evidence of the urban stressors affecting it and has not demonstrated measured improvement in either habitat quality or ecological stream health over the seventeen years of monitoring.

Since 2006, a yearly geomorphic assessment has been conducted during the spring at sites throughout the Wilde Lake watershed. Assessment occurs at the same locations each year. The main goal of the monitoring is to assess the temporal variability of the geomorphic stability of the stream channels upstream of the lakes as they react to restoration activities. Overall, implementation of projects in the watershed do not appear to have significantly improved the physical habitat in the tributary streams. Based on 2006 – 2022 geomorphic assessments, the Wilde Lake mainstem continues to degrade with localized changes in channel section and profile, especially in the downstream most reach. Changes in bed features include lateral bank erosion, bar formation, and high sediment supply. Depositional features are common with mid-channel bar development in some reaches, especially in the downstream reach. Bed and bank erosion is most evident along the downstream mainstem reach. Upstream reaches are not experiencing the same level of erosion as the downstream reach and have remained relatively stable over 2017-2022 period. The Wilde Lake mainstem has transitioned from a C4 to a B4 channel between 2018 and 2022 surveys as entrenchment has increased and width to depth ratios have decreased. A recently constructed stream restoration project in the upstream reach should provide increased stability to that portion of the watershed and reduce sediment supply to the downstream reaches. A fully developed riparian buffer is lacking along most of the channel, likely contributing to bank erosion and instability.

Red Hill Branch Monitoring

The County began monitoring in the Red Hill Branch watershed in 2009 and has continued annually through the present. The Red Hill Branch monitoring program includes geomorphic, chemical, physical habitat, and biological assessments conducted within and downstream of restoration projects to determine if the restoration projects are succeeding in reducing pollutant loading and increasing the health of the stream system. What follows is a brief summary of monitoring activities and results for 2022. More detail and results can be found in the annual report, *Red Hill Branch Restoration Monitoring Year 13 – 2020-2022*.

Stormflow data were collected at the permanent water quality monitoring station at the Red Hill Branch site at Meadowbrook Park on September 1 and November 12, 2021, and February 4, March 24, June 8, June 23, and June 26, 2022. Baseflow samples were also collected at these sites on August 31 and November 10, 2021, and February 2 and June 2, 2022. The August 31, 2021, baseflow event is used to replace the eighth storm for FY2022.

Event mean concentrations of storm runoff ranged from 0.45 – 5.17 mg/mL for total nitrogen, 17 – 223 mg/mL for TSS, and 0.01 – 0.30 mg/mL for total phosphorus. Average metal concentrations at Meadowbrook Park were below their respective acute and chronic MDE criteria for lead and zinc but exceeded the chronic criteria for copper. The June 8th storm event had a copper EMC greater than the acute criteria and lead EMCs above the chronic criteria. The November 12th storm had a copper EMC greater than the chronic criteria, and the February 4th storm had copper EMC greater than the acute criteria. E. coli levels for all samples continued to be well above the published water quality criteria, similar to results throughout the period of record.

A biological monitoring program was initiated in Red Hill Branch during the spring of 2010 and has continued annually. The program includes the collection and analysis of the macroinvertebrate community, physical habitat assessments, and measurements of in-situ water chemistry. Biological assessments involve macro-invertebrate sampling at three sites located at the downstream end of the major drainage areas within the Red Hill Branch subwatershed as well as a fourth control site located in an adjacent watershed. The monitoring stations are being used for the assessment of restoration activities in this watershed. In Red Hill Branch, post-restoration monitoring results indicate a subwatershed in an overall degraded ecological condition, with little change from the first two years of pre-restoration monitoring. During 2022, three of the four sites were classified as 'Very Poor' and the other site was classified as 'Poor' for biological condition, with BIBI scores of from 1.33 to 2.67: slightly worse

results than during 2021. Habitat assessments during 2022 were nearly identical to 2021 and 2020 results with all three Red Hill Branch sites and the control rated 'Degraded' for the Maryland PHI and classified as 'Non-Supporting' for the control site and one Red Hill Branch site, and 'Partially Supporting' for the other two Red Hill Branch sites for the RBP habitat assessment. The biological community and habitat continue to fluctuate slightly from year-to-year, with 2022 results a slight decrease from 2021, but remain in a degraded condition and have not shown any significant improvement after restoration. The Red Hill Branch subwatershed continues to suffer the effects of urbanization with impaired physical habitat and depressed ecological stream health.

Geomorphic assessments in the Red Hill Branch subwatershed were conducted in June of 2022, eleven years after the completion of the Bramhope Lane stream restoration project, to evaluate the effectiveness of this and other restoration projects undertaken in this subwatershed. Assessments were conducted at three sites, one within the lower portion of the restoration site, one downstream of the restoration site, and one on a similar channel in an adjacent watershed intended to serve as a control. Assessment included longitudinal profiles, permanently monumented cross-section surveys, pebble counts, substrate facies mapping, bulk-bar sample sieve analysis, and measurement of bed/bank pins and scour chains. In the years prior to restoration at all three reaches, bed features exhibited evidence of the continually shifting, dynamic nature of these urban systems, including deposition in some pools and bars, deepening of other pools, and shifting locations of riffle crests. At the two unrestored reaches, conditions have continued to be variable over the eleven years of post-restoration monitoring with periods of erosion and deposition with the trend toward channel widening and deepening as is observed in suburban/urban streams in central Maryland. After restoration, there has been far less change in channel dimensions and profile observed in the survey data, and notably less erosion during post restoration monitoring at the restoration reach. The restored reach is relatively stable with only small areas of bank erosion and deposition. The channel has aggraded approximately one foot in the restored reach between 2019 and 2021 but remained stable between 2021 and 2022. This is likely due to a dislodged debris jam upstream of the survey area that contributed sediment downstream into the survey reach.

Dorsey Hall Monitoring

The County began monitoring sites in Dorsey Hall project area in 2014 to assess new restoration activities in the Red Hill Branch watershed located downstream of the sites at Meadowbrook Park, Bramhope Lane stream restoration, and the Salterforth pond retrofit. Two sites were added, one on Red Hill Branch at Columbia Rd downstream of all restoration activities, and one site near the downstream end of Plumtree Branch upstream of its confluence with Red Hill Branch to measure effects of stormwater coming from the untreated Plumtree Branch. At each site chemical, biological, and physical habitat monitoring have been conducted annually. Full results of the monitoring are included in the report, *Dorsey Hall Restoration, Year 8, 2021-2022, Restoration Conditions Monitoring*.

Chemical monitoring at the Dorsey Hall project area consists of baseflow and stormflow chemical sampling for nitrogen, phosphorus, and sediment. Six storm events were sampled at the Columbia Road and Plumtree Run sites during 2021-2022. Storms were sampled on September 1, 2021, and February 4, March 24, June 8, June 23, and June 26, 2022. Baseflow samples were also collected at these sites four times: August 31 and November 10, 2021, and February 2 and June 2, 2022. For the Columbia Road site, EMCs ranged from 1.17 to 2.04 mg/mL for total nitrogen, 16 to 121 mg/mL for TSS, and 0.09 to 0.37 mg/mL for total phosphorus. At the Plumtree site, EMCs ranged from 1.19 to 1.94 mg/mL for total nitrogen, 26 to 170 mg/mL for TSS, and 0.11 to 0.70 mg/mL for total phosphorus.

Biological and physical habitat monitoring was conducted at these sites during spring of 2022 and narrative ratings for both sites were the same as those from 2021, 2020, and 2019. Identically to 2021 and 2020 results, both sites scored a 1.33 and rated 'Very Poor' for biological condition. Habitat results have been similar throughout the post-

restoration period. Maryland's PHI results for the Dorsey Hall sites again show both sites falling into the lowest 'Severely Degraded' category with scores of 48.0 for Columbia Road and 32.1 for Plumtree. The RBP habitat results were nearly identical to 2021 and 2020 results with both sites in the 'Not Supporting' category with scores of 47% and 52% of reference. The physical habitat results show that both sites are severely impacted, most likely from urban development with no evidence yet of ecological uplift after restoration.

Annual Data Submittal

Monitoring reports associated with Assessment of Controls monitoring including the programs summarized above, and the Rumsey Run Stormwater Management Assessment described below, can be found in the narrative files associated with the NPDES Geodatabase submittal. Also included are the monitoring site locations and drainage areas in the MonitoringSite and MonitoringDrainageArea feature classes.

The required chemical monitoring results and EMCs are found in the County's geodatabase submittal in the ChemicalMonitoring table for Wilde Lake and Meadowbrook (Red Hill). The County chose again this year, as it has the past five years, to also report on other monitoring that is being conducted above the NPDES requirements at several sites. These sites are partially funded by Chesapeake and Atlantic Coastal Bays funding and are focused on assessing watershed restoration; therefore, the County chose to include them. Because they are not NPDES compliance specific sites, they do not have all data as required by the NPDES permit. These sites are associated with the Dorsey Hall project (Plumtree - PT and Columbia Road - CR). For these sites, data from FY2022 were added to previously submitted data from FY16, FY17, FY18, FY19, FY20, and FY21.

The required biological monitoring data are included in the BiologicalMonitoring table for the Wilde Lake and Red Hill monitoring projects. As with the chemical data, there are additional biological data submitted for the Dorsey Hall monitoring project.

2. Stormwater Management Assessment

The County shall continue monitoring the Rumsey Run (tributary to Red Hill Branch) watershed, or select and submit for MDE's approval an alternative project for determining the effectiveness of stormwater management practices for stream channel protection. Physical stream monitoring protocols shall include:

- a. An annual stream profile and survey of permanently monumented cross-sections in Rumsey Run to evaluate channel stability in conjunction with surrounding and on-going commercial development;***
- b. A comparison of the annual stream profile and survey of the permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation; and***
- c. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.***

Annual Update Number 27 Status

In 2011, to evaluate the effectiveness of recent stormwater controls from developed sites for stream channel protection, Howard County, with MDE concurrence, chose an unnamed tributary to Red Hill Branch (hereafter

called Rumsey Run) within the Red Hill Branch subwatershed to study and analyze. The County is monitoring the effectiveness of the 2000 Maryland Stormwater Design Manual and other innovative stormwater management technologies through geomorphic assessments, limited runoff investigations, and modeling in Rumsey Run. The Rumsey Run study area was investigated because it includes developments with a variety of stormwater management measures, including unmanaged areas, wet ponds, underground storage, permeable pavement in one parking lot, and level spreaders at a townhouse complex and at single family residences. A full report of Rumsey Run monitoring methods, data analysis, and results are provided in the *Evaluation of the Effectiveness of Maryland Stormwater Management Practices on Rumsey Run Channel Stability Year Eleven – 2022* report, produced as a standalone document and submitted as part of the Annual Update.

The Upper Reach receives unmanaged drainage from an industrial park with high levels of impervious surfaces. As expected, this study confirms the Upper Reach is the least stable, with numerous headcuts and cross sections that show widening and downcutting. Higher valley and channel slopes in this section have exacerbated the degradation by accelerating the unmanaged flows and increasing shear stress. Over the duration of the study years, the Upper Reach has seen the largest variations in cross-sections and longitudinal profile data and the greatest tendency toward entrenchment, to the point that exposed infrastructure needed to be protected by the placement of gravel and riprap throughout the reach. Multiple headcuts in this reach have resulted in bed degradation around the headcuts impacting much of this reach.

The Middle Reach contains the Montjoy subdivision, which was completed in 2006 and includes ESD practices for stormwater management and MDE 2000 channel protection criteria. Of the three Reaches, the longitudinal profile in this Reach has seen the least amount of change across the monitoring years. The most notable feature changes from the 2021 to 2022 longitudinal profile surveys of the Middle Reach are the decline in frequency of pools and debris jams. The Middle Reach has a slightly lower slope than the Upper Reach, likely buffering the channel from bed and bank erosion, when compared to the Upper Reach. Sediment eroded from the Upper Reach may be settling out in the Middle Reach and contributing to the overall aggradation observed within this reach, especially observed in the data when comparing between 2021 and 2022 surveys. The Middle Reach has remained relatively stable and contains cross-sections with the least amount of measured change in terms of cross-sectional area and downcutting observed across monitoring years.

The Lower Reach is below a development constructed with contemporary stormwater management. Similar to the Middle Reach, the Lower Reach has experienced aggradation likely associated with instream sources of fine material eroding from the bed and bank upstream and settling further downstream. The Lower Reach has seen more gradual variation in channel dimensions and loss of pools overtime, which may be influenced by cumulative upstream activity. The main difference between the 2021 and 2022 surveys is an increase in bed elevation, and since the 2011 survey, the primary change is a loss of pools, both characteristics of sediment deposition. Given the nature of the watershed where three stormwater ponds mitigate runoff from only a portion of the watershed that was recently developed, it is difficult to determine the ameliorating effects of these stormwater facilities on stormwater flows in the developed areas compared to the pre-developed condition. Cross-sections in the Lower Reach show that the channel has become slightly wider over time.

The comparison of three stormwater techniques on Rumsey Run faces inherent limitations, as the Middle and Lower reaches receive cumulative flow (both unmanaged and managed) from upstream reaches. The influence of inputs from upper reaches reduces some of the validity of the Middle and Lower reaches as independent examples of their respective stormwater management techniques; therefore, they may be viewed more as sub-samples of the greater system. The overall results of the geomorphic assessment indicate that current stormwater management practices in the drainage areas of the Middle and Lower Reaches, designed according to channel protection criteria requirements, are associated with reduced rates of stream degradation when compared with

a reach that does not have stormwater management within its drainage area. It is suggested from this study that installation of stormwater retention BMPs hinders channel succession by attenuating peak flows and reducing shear stresses on the channel banks, which can be seen in the small annual variations observed in the longitudinal profile and cross-section analyses of the Middle and Lower Reaches, when compared to the larger annual variations in the Upper Reach.

Additional Assessment of Controls:

Countywide Biomonitoring Program Howard County performs annual Countywide biological stream monitoring to characterize stream and watershed health. There is currently no specific NPDES MS4 requirement to complete this type of monitoring, however the County recognizes the importance in understanding the conditions of its stream systems. Data are used for general characterization, to support watershed assessment and management efforts, and to track conditions over time. Because there is no specific requirement, Howard County is presenting a summary of the program here, and current reports are submitted for MDE's use; however specific site locations and site data are not included in the NPDES geodatabase. The included report is *Howard County Biological Monitoring and Assessment, Dorsey Run, Hammond Branch, and Rocky Gorge Watersheds – 2022*.

Program Overview

The Howard County Department of Public Works Stormwater Management Division initiated the Howard County Biological Monitoring and Assessment Program in the spring of 2001. The County initiated the monitoring program to establish a baseline ecological stream condition for all the County's watersheds. The program involves monitoring the biological health and physical condition of the County's water resources and is designed on a five-year rotating basis such that each of the County's 15 watersheds, or primary sampling units (PSU) will be sampled once every five years.

Round 1 was completed from 2001 to 2003, Round 2 from 2005-2009, and Round 3 from 2012-2016, with 10 randomly selected sites sampled in each PSU. The current year sampling (2022) is the final year of Round 4 which began in 2017. To allow for paired site comparisons with previous Rounds, a total of four sites from Round One (2001), Round Two (2005), and Round Three (2012) were selected for resampling in each PSU. The remaining six sites in each PSU were randomly selected.

The monitoring in each round involved sampling instream water quality, collection and analysis of the biological community (benthic macroinvertebrates) using Maryland Biological Stream Survey (MBSS) protocols, cross section analysis, particle size distribution, and assessment of the physical habitat using the United States Environmental Protection Agency's (EPA) Rapid Bioassessment Protocols (RBP). The sampling methods used are compatible with those used in the third round (2012-2016) with updates where applicable. All data collection occurred between March 1st and April 30th of 2022, as required by the MBSS protocols.

2022 Results

Biological and physical habitat assessment results for 2022 in Rocky Gorge, Hammond Branch, and Dorsey Run indicate subwatersheds that are moderately to severely impaired. Only one of the 30 benthic macroinvertebrate samples received a rating of 'Good' and two received a 'Fair' rating. The remaining sites (90%) were rated as either 'Poor' or 'Very Poor.' Site 09-102-R-2022 was the only site to receive a biological condition rating of 'Good.' No sites received a 'Good' or 'Fair' biological condition ratings in the Dorsey Run subwatershed.

RBP habitat assessment results indicate average subwatershed physical habitat conditions as 'Non-Supporting' for all subwatersheds. Only one site received 'Supporting' physical habitat ratings, located within the Hammond Branch subwatershed, and 37% of all sites sampled were only 'Partially Supporting.' The geomorphic assessment results indicate a variable system. Less than half of the channels sampled throughout the subwatersheds were classified as stable type B or C channels, the majority were classified as unstable, incised F or G type channels. Gravel and sand were the dominant substrate types in the majority of sampling reaches; however, silt/clay and cobble dominate streams were also present.

The average percentage of impervious area in the Rocky Gorge, Hammond Branch, and Dorsey Run subwatersheds is 7.3%, 15.0%, and 28.2%, respectively. Imperviousness for the areas draining to each sampling site range from 4.7% in Rocky Gorge to 37.0% in Dorsey Run.

Pearson correlations between the BIBI scores and physical habitat index scores (PHI and RBP) did not show significant relationships, suggesting that physical habitat index scores are not a reliable predictor of biological condition in these watersheds. Specific conductivity and BIBI scores showed a weak negative correlation that was not statistically significant. A strong positive correlation was observed between impervious percent and specific conductivity, suggesting that increased conductivity is related to increased urban runoff from impervious surfaces.

Results of the 2022 assessment indicate impaired biological conditions remain in the Rocky Gorge, Hammond Branch, and Dorsey Run subwatersheds. Hammond Branch saw a statistically significant decline in the mean BIBI score between 2003 and 2022.

G. Program Funding

1. ***Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted as required in PART V. below.***
2. ***Adequate program funding to comply with all conditions of this permit maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.***

Annual Update Number 27 Status

Howard County appropriated more than \$90 million to implement various aspects of NPDES activities and associated work during permit years FY06 through the first half of FY16 (the first half of FY16 is used since the County's new permit was issued halfway through FY16). The County continues to appropriate significant funding for its current permit, which was issued midway through FY16. Funding for the second half of FY16 through FY22 has exceeded the amount from FY06 through the first half of FY16. The Fiscal Analysis table in the geodatabase database has been completed to report on the funding for the current reporting period.

The database breaks out the funding into capital costs, operational costs, and information on the Watershed Protection and Restoration Fund (WPRF), as well as allowing the County to provide optional breakdowns for more specific task funding including maintenance. Capital costs include but are not limited to stream restoration and SWM construction projects, site-specific post-construction monitoring, and the purchase of monitoring equipment. Operational costs include but are not limited to County staff salaries, supplies, annually repeated expenses such as biological, physical, and chemical monitoring at NPDES program sites, illicit discharge inspections, SWM facility inspections, and public outreach efforts.

It's important to note that, for FY22, the County received significant funding in the form of a \$75 million Water Infrastructure Finance and Innovation Act (WIFIA) loan for the construction of the Ellicott City flood mitigation tunnel. This funding is not normal or expected year after year, and it is still unclear whether the project will have any water quality co-benefits that would be quantified as equivalent impervious acre credits.

The County was selected in FY21 to receive a \$2 million grant from the Chesapeake and Atlantic Coastal Bays Trust Fund for constructing a water quality project; the funds became available in FY22 due to State budgetary issues in FY21. These grant funds help the County leverage its available capital funds to be able to complete even more NPDES related water quality projects.

The County intends to maintain an adequate level of funding throughout the administratively continued permit term. As noted in previous Annual Updates, all funding shown herein and proposed is subject to yearly approval by the County Council and the County Executive.

Watershed Protection and Restoration Fund (WPRF)

In March of 2013, the County adopted legislation to enact the WPRF to be charged based on the number of 500 square-foot impervious units for all properties. In July of 2013 the legislation was amended to modify the manner in which residential properties were charged based on the size of the parcel. Three tiers were established, and the rates for townhomes, properties less than ¼ acre, and properties greater than ¼ acre are charged \$15, \$45, and \$90 per year, respectively. In addition, programs were established to provide reduced fees for agriculturally assessed properties and non-profit properties if they met certain criteria identified that reduced the potential for impact. Further, residential and commercial project reimbursement and fee credit programs were established for property owners that choose to add additional stormwater BMPs to their parcel or update existing BMPs to provide water quality.

In 2016, Council Resolution CR 37-2016 amended the WPRF Assistance Program for nonresidential properties. The Fee is deemed a hardship for nonresidential properties that do not qualify as not for profits if the Fee exceeds a percentage of the total property tax bill. The property owner then pays a Fee equal to that percentage of the total property tax due for the property. In 2019 the percentage was 5%, which was a 15% decrease from the original hardship percentage cap and will remain the cap going forward.

Residential and commercial reimbursement and credits amounts were updated in 2020 to reflect the increased costs associated with project installation, these are noted in CR35 and CR 105-2020. An additional incentive was created to allow those residential property owners with a financial hardship the opportunity to receive a 100% reimbursement less \$1.

The WPRF funds are budgeted among various County agencies to fund programs such as:

- BMP controls to manage stormwater flow and reduce pollutants
- Storm drain infrastructure, operation, repairs and upgrades
- MS4 permit compliance including monitoring and enforcement
- Stormwater education, outreach, and incentive programs

Section III. Program Review and Annual Progress Reporting

A. Annual Reporting

As required by the NPDES permit, the County is submitting all Annual Update Databases electronically using a large file sharing system. In addition to the required databases, the SWPPP reports, monitoring reports, and the NPDES Contact List are included as narrative files, and additional Source Identification GIS files are included.

B. Reapplication for NPDES Stormwater Discharge Permit

This permit is effective for no more than five years, unless administratively continued by MDE. Continuation or reissuance of this permit beyond this permit term will require Howard County to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. Failure to reapply for coverage constitutes a violation of this permit. As part of this application process, Howard County shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how the County is meeting the overall goal to ensure that each County watershed has been thoroughly evaluated and its progress in implementing water quality improvements. This application shall be used to gauge the effectiveness of the County's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

- 1. Howard County's NPDES stormwater program goals;*
- 2. Program summaries for the permit term regarding:*
 - a. Illicit discharge detection and elimination results;*
 - b. Restoration plan status including County totals for impervious acres, impervious acres controlled by stormwater management, the current status of water quality improvement projects and acres managed, and documentation of progress toward meeting stormwater WLAs developed under EPA approved TMDLs;*
 - c. Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved;*
 - d. Impervious acres compared to the baseline and twenty percent restoration requirement in PART IV.E.2.a.; and*
 - e. Other relevant data and information for describing County programs;*
- 3. Program operation and capital improvement costs for the permit term; and*
- 4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County's efforts to comply with the conditions of this permit.*

With Annual Report 23, Howard County formally reapplied for NPDES stormwater discharge permit coverage. Attachment 1 of MDE's August 2, 2019, comment letter acknowledges that the FY2018 Annual Report 23 serves as the County's reapplication for the NPDES stormwater discharge permit. Howard County's next permit will be the County's fifth-generation NPDES stormwater discharge permit.

In August 2018, MDE shared with the County draft language of the Assessment of Controls section of the next generation permit. The County met with MDE on September 21, 2018, to discuss the draft permit conditions associated with this section. In August 2019, MDE shared draft language for all sections of the permit except Part IV. Section E. Restoration for Total Maximum Daily Loads and Chesapeake Bay, which was still under development. MDE issued a tentative determination of the County's fifth-generation permit on March 11, 2022. The County submitted comments to MDE on the tentative determination on June 7, 2022; MDE has not responded to the County's comments. The County appreciates the opportunity to review and discuss the permit language and would be interested in reviewing future iterations of the next generation permit, as they become available.

Section IV. Special Programmatic Conditions

A. Chesapeake Bay Restoration by 2025

A Chesapeake Bay TMDL has been developed by the EPA for the six Bay States (Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia) and the District of Columbia.

The TMDL describes the level of effort that will be necessary for meeting water quality criteria and restoring Chesapeake Bay. This permit is requiring compliance with the Chesapeake Bay TMDL through the use of a strategy that calls for the restoration of twenty percent of previously developed impervious land with little or no controls within this five year permit term as described in Maryland's Watershed Implementation Plan. The TMDL is an aggregate of nonpoint sources or the load allocation (LA), and point sources or WLA, and a margin of safety. The State is required to issue NPDES permits to point source discharges that are consistent with the assumptions of any applicable TMDL, including those approved subsequent to permit issuance.

Urban stormwater is defined in the CWA as a point source discharge and will subsequently be a part of Maryland's WLA. The NPDES stormwater permits can play a significant role in regulating pollutants from Maryland's urban sector and in the development of Chesapeake Bay Watershed Implementation Plans. Therefore, Maryland's NPDES stormwater permits issued to Howard County and other municipalities will require coordination with MDE's Watershed Implementation Plan and be used as the regulatory backbone for controlling urban pollutants toward meeting the Chesapeake Bay TMDL by 2025.

B. Comprehensive Planning

Howard County shall cooperate with other agencies during the completion of the Water Resources Element (WRE) as required by the Maryland Economic Growth, Resources Protection and Planning Act of 1992 (Article 66B, Annotated Code of Maryland). Such cooperation shall entail all reasonable actions authorized by law and shall not be restricted by the responsibilities attributed to other entities by separate State statute, including but not limited to reviewing and approving plans and appropriating funds.

Annual Update Number 27 Status

The County recognizes the importance of the Chesapeake Bay restoration effort and has been working with MDE and other municipalities to help achieve the goals of the 2014 Bay Agreement. The following paragraphs describe Howard County's recent and ongoing participation in programs that address the Chesapeake Bay water quality goals.

Patuxent Reservoirs Technical Advisory Committee

In 1996, Howard County joined Montgomery County, Prince George's County, WSSC, Maryland National Capital Park and Planning Commission (MNCPPC), HSCD, and Montgomery Soil Conservation District (MSCD) in signing the Patuxent Reservoirs Watershed Protection Agreement. The Agreement recognized the importance of protecting the long-term biological, physical and chemical integrity of the watershed. The Agreement established a Policy Board and a Technical Advisory Committee (TAC) to oversee implementation of a protection strategy for the watershed.

The TAC has developed a list of priority resources in the watershed: the reservoirs and drinking water supply; terrestrial habitat; stream systems; aquatic biota; rural character and landscape; and public awareness and stewardship. Each priority resource has designated goals and implementation items for the TAC to restore and maintain the resource. Over the past several years, the TAC has been updating the goals, implementation items

and timeline for each resource. TAC member implementation activities have included water quality monitoring and modeling, implementing agricultural best management practices, stormwater retrofits, stream channel restoration, and public outreach and education.

TAC member agencies continued work in the following areas: TMDL implementation for the Patuxent Reservoirs, agricultural BMP implementation, reservoir water quality monitoring, and public outreach. Reservoir water quality monitoring was scaled back in 2020 due to the Covid-19 pandemic but resumed in 2021.

- In 2014, the TAC revised the Patuxent Reservoirs Protection Strategy Memorandum of Understanding, which established an Agricultural BMP Cost Share Program, to make more properties eligible for the program and increase the types of BMPs the program would fund. WSSC and Howard County renewed program funding for HSCD; MSCD funds have been spent, but a request for additional funds is on hold until Montgomery County determines the funding source for their match.
- In 2016 the TAC conducted research related to road salt impacts in the watershed and recommended the Policy Board form an interjurisdictional workgroup to develop a comprehensive salt reduction plan for the watershed. In 2018 and 2019, the WSSC convened Salt Summits to bring together State and local agencies to discuss road salt management efforts. At the 2019 summit, attendees agreed to form workgroups to investigate management/policy, monitoring and public outreach, prior to the next summit. The TAC has membership on each workgroup. The workgroups held their kickoff meetings in 2021 but have not met since. In FY22, TAC efforts included a presentation by MDE on the agency's approach to winter salt reduction strategies in Maryland, particularly in terms of NPDES stormwater permit requirements, and an update on the SHA-MDE study on specific conductance in the Triadelphia Reservoir watershed. In addition, Montgomery County began a specific conductance pilot study in the Patuxent River at Route 97 and the Hawlings River at Route 650.
- In 2018, the TAC completed its assessment of progress toward TMDL implementation and began assessing opportunities to increase implementation efforts. In 2019 the TAC determined that planting riparian buffers was the most cost-effective BMP to help achieve the TMDLs. In 2020, the TAC began an effort to revise the implementation analysis for the Triadelphia sediment TMDL and the Rocky Gorge phosphorus TMDL. In FY22, WSSC drafted a technical memorandum to MDE summarizing an analysis that the Sediment TMDL for Triadelphia Reservoir has been met.
- In FY22 the TAC and Prince George's County GIS staff continued efforts to gather GIS data layers from each County and create watershed-scale maps. The first project for the mapping effort is to determine areas in need of riparian buffer planting.

The TAC produces an Annual Report that documents the TAC's accomplishments for the past year and priorities for the upcoming year.

Howard County's major initiatives in the Patuxent Reservoirs watershed include several capital projects, as well as ongoing biomonitoring and public outreach activities. There is a pond repair / stream restoration (Cherrytree Farms 1 / 2 project) that is currently under design in the Cherrytree Farm neighborhood in the Rocky Gorge reservoir watershed. There is also a pond repair project off Scottswood Court in the Brighton Dam watershed. The first round of biomonitoring was conducted in the reservoirs watershed in 2001 and 2003, and a second round of monitoring was done in the Cattail Creek and Brighton Dam watersheds in 2005 and in the Rocky Gorge watershed in 2009. The third and fourth rounds of biomonitoring were conducted in 2012 and 2017 in the Upper and Lower Brighton Dam and Cattail Creek watersheds. Covid caused a delay in biomonitoring, but the fifth round of biomonitoring was conducted in 2022 in the Rocky Gorge and Patuxent Upper watersheds. The fifth round of biomonitoring for the Cattail Creek watershed is scheduled for 2023.

Patuxent River Commission

Howard County is a member of the Patuxent River Commission, which provides oversight for implementation of the Patuxent River Policy Plan and development of the Chesapeake Bay Watershed Implementation Plan (WIP). The Policy Plan is a land management strategy to reduce nonpoint source pollution, and protect and restore habitat in the Patuxent River watershed. The WIP specifies actions to achieve pollutant load reductions from wastewater treatment plants, septic systems, agriculture and urban stormwater, to meet the Chesapeake Bay Total Maximum Daily Loads for nitrogen, phosphorus and sediment. In 2014, the Commission adopted an update to the Policy Plan to reflect the new Bay TMDLs. This update was subsequently adopted by the local member jurisdictions, including Howard County, and approved by the Maryland General Assembly in 2016. For more information about the Patuxent River Commission, please see the Maryland Department of Planning web page at <https://planning.maryland.gov/Pages/OurWork/PaxRiverComm/PatuxentRiverCommInfo.aspx>.

Water Resources Element

The Howard County Water Resources Element (WRE), adopted in April 2010, is an amendment to PlanHoward 2030 that adds Policies and Actions intended to ensure that the County has adequate water resource capacities to meet future growth needs through 2030. In particular, the WRE seeks to ensure a safe and adequate supply of drinking water, and adequate land and water capacity for the treatment of wastewater and stormwater. The WRE reflects the opportunities and limitations presented by local and regional water resources. It is intended to improve protection of land and water resources and to address water resource goals within the context of local and State smart growth policies. The WRE is available on the County web page at <https://www.howardcountymd.gov/sites/default/files/media/2016-03/WRE201004.pdf>. In 2020, the County began the process to update the General Plan, including the WRE. The new General Plan, known as HoCo By Design, is expected to be adopted in early 2023.

Cooperative Project with the U.S. Geological Survey

Howard County continues cost-sharing for the cost to operate a U.S. Geological Survey (USGS) flow gauging station on the Little Patuxent River near Savage, MD.

Maryland Water Monitoring Council

The County continues to participate in the MWMC's annual conferences.

References

- Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency, Office of Water, Washington DC.
- Chesapeake Stormwater Network. 2017. U-6 Elimination of Individual Nutrient Discharges from Gray Infrastructure. Retrieved from: <http://chesapeakestormwater.net/bmp-resources/illicit-discharge-detection/>
- Chesapeake Bay Program. 2014. Expert Panel Report on removal Rates for the Elimination of Discovered Nutrient Discharges from Grey Infrastructure. Retrieved from: https://www.chesapeakebay.net/documents/grey_infrastructure_expert_panel_report_102714.pdf
- Federal Highway Administration Agency, 2003. Stormwater Best Management Practices in an Ultra-Urban Setting. Accessed in May 2003 at https://www.environment.fhwa.dot.gov/env_topics/water/ultraurban_bmp_rpt/index.aspx
- Howard County. Draft - Howard County Fiscal 2013 Capital Budget. Ellicott City, Maryland. 2012.
- Howard County DPW/SWMD. 2005. Centennial and Wilde Lake Watershed Restoration Plan. Prepared by the Center for Watershed Protection and Tetra Tech, Inc. for Howard County, MD. September.
- Howard County DPW/SWMD. 2009. Upper Little Patuxent River Watershed Management Plan. Prepared by KCI Technologies, Inc. for Howard County, MD. September.
- Howard County. National Pollutant Elimination System Permit Application for Operators of Municipal Separate Storm Sewer Systems. Part 1. Ellicott City, Maryland. July 1993.
- Howard County. National Pollutant Elimination System Permit Application for Operators of Municipal Separate Storm Sewer Systems. Part 2. Ellicott City, Maryland. April 1995.
- Howard County. *NPDES Permit No. MS-HO-95-008 Annual Update Number 1-5*. Ellicott City, Maryland. April 1996 – April 2000, respectively.
- Howard County. *NPDES Permit No. 00-DP-3318 Annual Update Number 6-10*. Columbia, Maryland. June 2001 – June 2005, respectively.
- Howard County. *NPDES Permit No. 00-DP-3318 Annual Update Number 11-18*. Columbia, Maryland. June 2006 – June 2013, respectively.
- Howard County. 2017. Dorsey Hall Year 3 (2016-2017) – Post Restoration Conditions Monitoring. Prepared by KCI Technologies Inc. for Howard County, MD.
- Howard County. 2017. Evaluation of Maryland Stormwater Management Methods in Rumsey Run – Year 6 (2017). Prepared by Straughan Environmental, Inc. for Howard County, MD.
- Howard County. 2017. Turf Valley Restoration Year 4 (2016-2017) – Post Restoration Conditions Monitoring. Prepared by KCI Technologies Inc. for Howard County, MD.

Howard County. 2017. Red Hill Branch Watershed Restoration – Year 8 (2016-2017) – Post Restoration Conditions Monitoring. Prepared by KCI Technologies Inc. for Howard County, MD.

Howard County. 2017. *Wilde Lake Watershed Discharge Characterization, Stream Monitoring and Watershed Assessment, Year Twelve – 2017*. Prepared by KCI, Inc. for Howard County, MD.

KCI Technologies, Inc. 2018. Enhanced IDDE Pilot 2017. Prepared by KCI for Howard County DPW.

Kellerhals, R. 1967. "Stable Channels with Gravel-Paved Beds," *Journal of Waterways and Harbors Division*, American Society of Civil Engineers, pp 63-84.

Maryland Department of the Environment (MDE 2021 Guidance). *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*. November 2021 FINAL.

Maryland Department of the Environment (MDE). TMDL Implementation Progress and Planning Tool (TIPP). Version 11/12/2021;

<https://mde.maryland.gov/programs/Water/TMDL/DataCenter/Pages/TMDLStormwaterImplementation.aspx>

Maryland Department of the Environment (MDE 2021 Guidance). *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*. November 2021 FINAL.

Maryland Department of the Environment (MDE 2014 Guidance). *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*. August 2014.

Maryland Department of the Environment. 2000 Maryland Stormwater Design Manual. Revised May 2009.

Maryland Department of the Environment. National Pollutant Elimination System Permit Application Guidance for Operators of Municipal Separate Storm Sewer Systems. Part 2. Final. Baltimore. July 1992.

Maryland Department of Planning Website: <http://www.mdp.state.md.us>

Northern Virginia Planning District Commission, 1979. Guidebook for Screening Urban Nonpoint Pollution Management Strategies. Prepared for the Metropolitan Washington Council of Governments

Parker G. 1979. Hydraulic geometry of active gravel rivers, *Journal of Hydraulic Engineering*, 105, 1185-1201.

Paul, M.J., J.B. Stribling, R.J. Klauda, P.F. Kazyak, M.T. Southerland, and N.E. Roth. 2002. A Physical Habitat Index for Freshwater Wadeable Streams in Maryland. Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment Division. Annapolis, MD. CBWP-MANTA-EA-03-4.

Schueler, T.R. 1987. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs. Metropolitan Washington Council of Governments. Publication number 87703. p. A-4.

Waters, T. F. 1995. *Sediment in Streams: Sources, Biological Effects and Controls*. American Fisheries Society Monograph 7. American Fisheries Society, Bethesda, MD.